

AMATEUR RADIO

DECEMBER 1963



Vol. 31, No. 12

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"AMATEUR RADIO"

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910.

DECEMBER 1963

Vol. 31, No. 12

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10 a.m. to 3 p.m. only.

Publishers:

VICTORIAN DIVISION W.I.A.,
Reg. Office: 65a Franklin St., Melbourne, Vic.

Printers:

"RICHMOND CHRONICLE," Phone 42-2419.
Shakespeare Street, Richmond, E.1, Vic.



All matters pertaining to "A.R." other
than subscriptions, should be addressed to:

THE EDITOR,
"AMATEUR RADIO,"
P.O. BOX 36,
EAST MELBOURNE, C.2, VIC.

Acknowledgments will be sent following
the Committee meeting on the second Mon-
day of each month. All Sub-Editors should
forward their articles to reach "A.R."
before the 5th of each month. Any item
received after the Committee meeting will
be held over until the next month. Pub-
lication of any item is dependent upon space
availability, but in general about two
months may elapse before a technical
article is published after consideration by
the Publications Committee.



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OUR COVER

The Trophy presented to the win-
ner of the Ross Hull Memorial V.h.f.
Contest.

FEDERAL COMMENT



Around 1946, Dr. Werner von Braun, the now famed American rocket
specialist who originally designed the V2 bomb, wrote his "Mars Project"
—hardly a book, as it was a step by step design of the necessary facilities
required to send a space vehicle to Mars—in which it was postulated that
frequencies in the vicinity of 140 Mc. would be the most suitable for
space-to-space communications and probably earth-space control. At this
time, it had not been possible to test this theory, but subsequent launch-
ings of probes and satellites have given scientists and the electronics
the opportunity to put this early theory to the test.

It is evidence itself that the Doctor's pronouncement was correct,
when at Geneva in 1959, a new Earth-Space service came into being and
was allocated a number of small portions of the spectrum for this work,
the lowest assignment being 136-137 Mc. Since 1959, the number of
launchings have gradually increased to the stage where a sufficient number
of frequencies were not available to cater for the necessary control of
these space vehicles. The result has been the need for an Extraordinary
Radio Conference on this subject alone and at the time of writing such
a meeting is still under way at Geneva.

It was not by chance that the W.I.A. happened to have a representa-
tive in Geneva for this Conference—from which he will have returned
by the time this is read—but the result of his having been a member of
a Government committee which arranged the brief for the official delega-
tion to Geneva and of also being appointed as an official observer with
the delegation. For the reasons given above, there has been continuous
indirect pressure on the services allocated frequencies in the 140 Mc.
region to make room for expansion of the Space requirements. This
information, for a variety of reasons, has not been widely known, but
the Executive have had the matter, through our representative, constantly
under surveillance. This, to a large extent, has been the reason why
the delegation's brief was to maintain the status quo for the Amateur
frequencies in this part of the spectrum.

Although there is still a large amount of work and other determinations
to be made, we are happy to report through our representative in Geneva,
that despite quite a struggle, the status quo for the Amateur in Australia
and throughout the world, has maintained the 1959 Geneva allocations.
The exception is that a footnote allows Amateurs to make use of OSCAR
type satellites for communication purposes between 144-146 Mc. This has
been again a great triumph for the Amateur everywhere and particularly
in Australia, and does not in these few brief words indicate the amount
of effort that has been poured into deliberations to achieve this happy
state of affairs.

With the festive season so close upon us, no nicer Christmas present
could have been given the Amateur Service than this knowledge that yet
one more battle for frequencies has been won. It is with the greatest
satisfaction that Federal Executive wishes all members and non-members
alike a very happy Christmas!

FEDERAL EXECUTIVE, W.I.A.

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AC125	General purpose audio pre-amplifier and driver of the p-n-p alloy junction type	32	32	10	100	5	90*	500**	TO-1
AC126	High-gain audio pre-amplifier and driver of the p-n-p alloy junction type	32	32	10	100	5	90*	500**	TO-1
AC127	n-p-n/p-n-p germanium alloy junction transistors for use in complementary Class 'B' output stages	+32	+32	+10	+200	+10	90*	280**	TO-1
AC132		32	32	10	200	10	90*	500**	TO-1
AC128 2-AC128	High-gain germanium alloy junction transistor of the p-n-p type designed for use in Class 'B' output stages	32	32	10	1A	20	90*	550**	TO-1
AD140 2-AD140	Germanium junction power transistor of the p-n-p alloy type intended for use as an amplifier in the output stages of receivers and amplifiers operating from either battery or AC mains.	55	55	10	3.0A	500	100*	35W**	TO-3
AF114N	Germanium transistor of the p-n-p alloy diffused type designed for use up to 100Mc/s	32	32	—	10	1	75	50***	TO-44
AF115N	Germanium transistor of the p-n-p alloy diffused type designed for use up to 100Mc/s as mixer-oscillator and for use as RF amplifier up to 27Mc/s	32	32	—	10	1	75	50***	TO-44
AF116N	Germanium transistor of the p-n-p alloy diffused type designed for use as mixer-oscillator and RF amplifier up to 16Mc/s	32	32	—	10	1	75	50***	TO-44
AF117N	Germanium transistor of the p-n-p alloy diffused type designed for use as mixer-oscillator and RF amplifier up to 6Mc/s	32	32	—	10	1	75	50***	TO-44
OC74N 2-OC74N	High-gain germanium alloy junction transistor of the p-n-p type designed for use in Class 'B' output stages	20	20	6	300	—	90*	550**	TO-1

*** $T_{amb} = 45^\circ\text{C}$

** with suitable heat sink

* 200 hours operation

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M 127

Checking Signal Quality with the Receiver*

GEORGE GRAMMER, W1DF

AMATEUR c.w. and phone transmitters generate signals that are intended to be listened to at the receiving end. The quality of the signal is judged by what the receiving operator hears. (Discounting the S meter reading, of course!) This being the case, there is no better "ultimate" instrument than a good receiver for checking a transmitter. Practically every Amateur, therefore, has the means right at hand for finding out whether his transmissions will stand close inspection.

Lack of fancy test equipment is no excuse for putting out a poor signal. Oscilloscopes and meter-type indicators are invaluable while making adjustments and in routine monitoring, if what they present visually is properly interpreted. But the answers they give are, at best, indirect and somewhat inconclusive; they cannot show the actual frequency band occupied by a signal, for example.

What to listen for, in using a receiver for transmitter checking, has been covered in an earlier article.¹ How to go about doing it when the transmitter and receiver are in close proximity is another matter. The receiver, like any other device used for measurement, is quite capable of giving false results when not handled properly.

The problem can be stated in simple terms: The transmitter's signal must be reduced in strength to a level well within the receiver's normal signal-handling capability. But transmitter testing has meaning only when the transmitter can deliver its full output, while F.C.C. regulations forbid the extensive one-way transmissions you have to make in finding out what, if anything, is wrong. So testing on the regular antenna is "out". The use of a dummy antenna is mandatory.

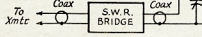
DUMMY ANTENNAE

At one time a good dummy antenna that would handle some power was mostly something to dream about. However, in recent years several solutions have been offered. There are low-cost commercial dummies available, including kits, for practically any legal Amateur power level. There are also rod-shaped ceramic resistors (Globar type CX) in values equalling transmission line impedances essentially non-reactive and capable of dissipating up to 100 watts.² Methods for using ordinary resistors also have been devised, at least for powers up to 100 watts or so.³ Any Ham who can afford a transmitter can afford a dummy antenna to go with it—and he should have one.

● No oscilloscope, audio generator, v.t.v.m., or whatnot? No handicap, either, and no excuse for having a poor signal. You can find out what you need to know about your transmitter's output without any of these things, useful as they are.

It is a mistake to assume that to be useful for transmitter testing a dummy antenna has to have some specified ideal characteristics, such as a pure resistance of 52 ohms over a wide frequency range. Such a dummy is convenient to use and will let you measure your actual power output, with the help of an r.f. ammeter. But this isn't all necessary. The principal thing is that the dummy should be capable of dissipating whatever power the transmitter puts out, and should be reasonably stable in operation. That is, its resistance should not change to any significant extent with heating. It is for this reason that incandescent lamps are not suitable; the lamp resistance depends too much on the current in the filament. This is not a serious handicap in rough adjustment of a transmitter, but it is a distinct disadvantage when modulation, especially s.s.b., is being checked, and can lead to erroneous observations.

Non-inductive wire-wound resistors are available in the 10-watt size (Sprague 457E) at reasonable cost, and although not completely free from reactance at Amateur frequencies, this causes no difficulties when an exact value of "pure" resistance is not re-



quired. They can be wired in various combinations of parallel and series to come out in the neighborhood of 50 to 75 ohms, and need no special treatment—other than keeping connecting leads short—if your transmitter's final stage has adjustable loading. If it doesn't, any practicable combination of such resistors can be made to look like a pure resistance of the desired value by the method shown in Fig. 1. The s.w.r. indicator shows when the resistance is transformed to the right value to match a transmission line.

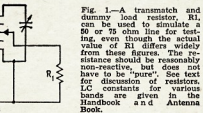
The common parallel-tuned matching circuit is shown in Fig. 1, but if you already have a transmatch using a different circuit it can be used just as readily. Whatever the circuit, the adjustments are made in the same way as when an actual transmission line or antenna is used in place of the dummy antenna, R1.

Putting a dummy antenna together in this way makes economic sense only when it can be done at a considerable

saving as compared with buying a complete unit. It is probably not very attractive for continuous power levels above 50 to 100 watts. But bear in mind that a resistor combination capable of dissipating, say, 50 watts continuously will take at least 100 watts with c.w. keying and probably as much as 200 watts p.e.p. on s.s.b., because of the intermittent nature of the transmitter's output.

The tuned dummy antenna arrangement can be used successfully even if no s.w.r. bridge is handy. It simply takes a bit more cut-and-try. Put the transmitter's controls at the settings normally used when working into an antenna, and then try different coil-tap positions and tuning adjustments in the transmatch until the transmitter loads normally with a minimum of readjustment of the transmitter's controls.

For higher power there are some expedients (which are also useful at low power). Heating elements from household appliances such as irons and toasters will dissipate quite a lot of power. These elements usually have a flat-strip resistance wound on mica cards. While they are far from non-inductive, the inductance is not so high as to make them unusable. It may even be possible to use the appliance as is; the writer has had good results on all bands from 80 to 10 simply by clipping onto the plug terminals of an old-



fashioned "no-pop-up" toaster and connecting it directly to the transmitter. The amplifier tank circuit, a pi network having the garden-variety LC constants, handled it just as well as it handled a perfectly-matched transmission line. Any such appliance is worth a try. One having a detachable line cord would appear to have the best chance of working, although it may even be possible to feed the r.f. through the cord in some cases.

TEST SET-UP

The complete test set-up is shown in Fig. 2. An essential part of it is the "factor"—the substitute for you in your regular capacity as talker on phone or key manipulator on c.w. Actually, you don't need a substitute for c.w. testing since it isn't difficult to operate a key while tuning the receiver and listening. However, if you have an electronic keyer it can be set to make continuous dots, thus letting you have both hands free.

* Reprinted from "QST," March, 1963.

¹ Grammer, "Looking at Phone Signals," "QST," December, 1962; "A.R.," November, 1963.

² Available through Workman T.V. Inc., 309 Queen Anne Road, Teneck, N.J., U.S.A.

³ Tilton, "V.H.F. Dummy Loads," "QST," March 1960. Geiser, "Wide-Band Moderate-Power Dummy Loads," "QST," December 1958.

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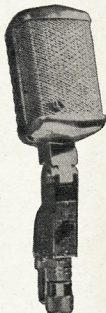
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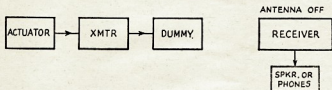
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Phones: 25-1300, 25-4556

Phone is a different story. You can't talk and do a good job of listening to your signal at the same time. Neither can you hope to enlist someone else's voice for an extended period. What is needed is an untiring source of audio comparable with what you put into the microphone yourself. Also, if you want to use a speaker instead of headphones in your testing it must be a **silent** source. The ideal actuator is a tape recorder. If you have one, as many Hams do, you obviously can record your own voice and do your testing under conditions as close as possible to actual operation on the air. Recorders usually have pre-amplifier or external speaker connections, or both, from which audio can be taken, and it requires no circuit diagram to feed one or the other of these outputs into the microphone jack on the transmitter.

There is one possible hitch—the output voltage level may be higher than is desirable for going into the microphone pre-amplifier. This can be handled, usually, by cutting down the gain in the recorder's amplifier so no

Fig. 2.—Set-up for using the station receiver for transmitter checking.



stage ahead of the gain control in the transmitter's speech amplifier will be overloaded. If hum becomes bothersome when this is done, it can be overcome by using a simple external attenuator as shown in Fig. 3. R1 should be about 10 times R2, and the sum of the two should equal whatever resistance the pre-amplifier output of the recorder is intended to work into, if the pre-amplifier output is used. As this resistance value is fairly high, shielded wire should be used for the connections, in order to avoid stray hum pick-up. It may also be necessary to shield the resistors, which can easily be done by wrapping them with aluminum foil over a wrapping of paper for insulation, with the foil connected to the shields on the connecting wires.

If the audio is taken from the speaker output terminals, the total resistance may be of the same order as the voice coil impedance, usually around 8 ohms. The value isn't critical, and as long as a low resistance is used, shielding should not be necessary. Needless to say, the recorder's internal speaker should be shut off if you want to listen with a speaker on your receiver.

If you don't have a recorder there are still other possibilities. A phono-

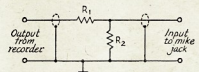


Fig. 3.—Simple voltage divider for reducing audio voltage to a manageable level for the transmitter's speech amplifier. Ordinarily, R1 will have about ten times the resistance of R2. A variable control having the same overall resistance can be substituted for the two resistors.

graph is one; there are many 100-per-cent. voice recordings that are suitable for the purpose. The output of a phono pick-up is not generally usable directly, since a crystal or ceramic pick-up ordinarily has too much to simulate a microphone and a magnetic has too little. Here again you can take the output from a pre-amplifier, using an attenuator as in Fig. 3 if necessary. The same type of attenuator can be used directly on a crystal pick-up, with resistances totalling something of the order of 1 to 5 megohms. Shielding is a necessity with such high resistances.

Still another source of continuous talk, or very nearly so, is the a.m. broadcast band. Audio can be taken from the speaker voice-coil terminals in the b.c. receiver, but use caution with small power-line radios. Make sure that neither voice-coil terminal is tied to a "hot" a.c.-d.c. chassis before you try this method. The output voltage problem is the same as with the recorder, and should be handled in the same way. One speaker lead will have to be disconnected from the speaker

itself if you want "silent" audio. A transistor set is handy because of its portability and because it will have no hum. Even an old-fashioned crystal receiver can be used.

By one means or another, a suitable actuator can be rigged up at practically no cost. It would be hard to find a household without a radio, and not much less so to find one without a phonograph. Even the tape recorder is fast becoming a household item.

THE RECEIVER

A normally shielded transmitter working into a dummy antenna, even if the dummy is not shielded, should not radiate more signal than can be handled by the receiver. No doubt it will be necessary to disconnect the receiving antenna; after all, the "spray" from the transmitter will still be rather strong within a few feet of the set. Here a great deal depends on the overall shielding, both transmitter and receiver, so it is possible to talk only in general terms. Re-read what was said in the earlier article¹ about setting the receiver's controls. You should aim to get the signal pick-up down to the point where you can use about the same gain settings on your own signal as you did on distant signals when the receiving antenna was connected. If the receiver, transmitter and dummy antenna are really well shielded, it may be necessary to use a few inches of wire as a receiving antenna in order to get the needed signal strength. If the signal is too strong, try running the antenna trimmer off tune, and if that doesn't do it, try pulling out the r.f. amplifier tube in the receiver—anything that will let you get a moderately strong signal with the gain

settings you found optimum for listening to incoming signals.

One further point needs consideration in using the receiver for monitoring. In c.w. and s.s.b. testing (and to a lesser extent with controlled-carrier a.m.) the load that the transmitter puts on the power line varies with the modulation. This may cause the line voltage to fluctuate, possibly with adverse effects on the receiver's stability. To settle this question, use the receiver normally—i.e. with the antenna connected and an incoming signal tuned in. Pick a frequency sufficiently far from your transmitting test frequency so there is no interference from it.⁴ Let the transmitter operate into the dummy antenna and watch carefully for any change in best note in the incoming carrier, or shift in naturalness on s.s.b., while your transmitter is being modulated. If the receiver stands this test, you're ready to go. If it doesn't, there is no simple alternative but to try to find an a.c. outlet for the receiver that won't show such large voltage changes. While instability of this sort won't have an appreciable effect on the bandwidth of the transmitter, as measured by the receiver, it can be misleading if you are listening for carrier frequency shift or keying chirps. If there is no way to avoid it you have to discount transmitter stability checks to some degree.

Once you're sure you've eliminated any possibility of receiver overloading and instability, examine your transmitter's signal carefully. Using the highest available selectivity, check the bandwidth as described in the earlier article, and listen particularly for spurious "burps" outside the channel the signal should occupy legitimately. As you can readily vary the audio gain in the transmitter while listening, it is no problem at all to find the level at which spurious sidebands start to become noticeable. In turn, this level can be observed on the transmitter's meters. Their readings may surprise you in comparison with what you've been seeing in your ordinary operating. But after a test such as this, they will take on some real significance, where before you had been working in the dark.

To have the most meaning, the actuating signal should be your own voice, which is why a tape recorder makes such an excellent addition to the test gear. If you have to use other voices, try to avoid those having entirely different pitch and timbre. If a radio is the "actuator," scout around among the disk jockeys and compare the results.

Testing in this way doesn't strain finances, but when done intelligently it will give you all the information you need about your signal. If your pals on the frequency miss you for an evening, you'll be all the more welcome when you get back, provided you've cleaned up the things that may have been wrong. This, and the confidence that your transmissions will stand critical examination, should be more than ample payment for the small trouble and the time off the air.

⁴If connecting the antenna to the receiver causes feedback troubles, the transmitter can temporarily be put on a different band, preferably higher in frequency, while the receiver is being checked in this way.

HOW SIMPLE CAN YOU GET?

A TWO-BAND RECEIVER FOR AMATEUR SERVICE

VOL. MOLESWORTH,* VK2VO

THERE is nothing original or clever about this receiver. It was designed and built for a young new Amateur, fresh with his Z call, who wanted a simple and inexpensive receiver to cover the two-metre band and also to tune in Divisional broadcasts on 7146 kc. and callbacks on 7050 kc. It turned out to be such a hot little unit that it was decided to write it up for "A.R." There may be other beginners around who want a simple set. For this reason a fairly detailed description will be given of layout, circuitry, and alignment.

This receiver is presented, also, as an example of the correct use of disposals gear. Except for such "finished" units as BC221 frequency meters, complete receivers and other odd items, most disposals gear needs considerable modification before being of use in the shack. The correct use of this type of equipment, we suggest, is to isolate the components of use, and re-build them on a new chassis, using the relevant portions of the old front panel as a template for a new panel. This has a number of advantages; but to state only two, it enables the new Amateur to standardise on a given chassis size, and the new front panels, painted grey and labelled with Teknical transfers, give a professional finish to the gear—something of which even the fundamentals and XYLS will approve.

This receiver is part of a complete two-metre station, comprising three chassis which will sit one above the other in a tabletop cabinet. At the time of writing, only two of the units have been built and tested—the power supply chassis, which contains two separate power supplies (one for the receiver, the other for the transmitter and modulator), and the receiver chassis. The chassis are 13" x 7" x 2", and the front panels are 14" x 9". The chassis are mounted with half an inch panel clearance at the bottom and at each side.

THE TUNER

There are six controls and a S meter on the front panel. At the centre is the large tuning knob, calibrated 0 to 100; to the left of the meter is the b.f.o. trimmer; from left to right along the bottom of the panel: the audio gain, meter zero, r.f. gain, and bandswitch.

The bandswitch in one position connects the 40 metre aerial to the primary of the aerial coil of the tuner; in the other position it does three things: (1) it earths the 40 metre aerial, (2) puts high tension on the two-metre converter, and (3) connects the output of the converter to the primary of the aerial coil.

The tuner covers from 4 to 7.5 Mc. The tuning condenser (three gang) and the aerial, r.f. and oscillator coils are taken from an RC8 transceiver. This originally covered from 2 to 4 Mc., and

from 4 to 10 Mc., in two switched bands. We took only the higher frequency coils and by adding capacity across the gang, and twiddling the coil slugs, brought them down to a top limit of 7.5 Mc. Similar coils are found in a number of disposals transceivers, such as the No. 19, 122, etc.

One stage of r.f. amplification is used, a 6BA6, but a 6U7 would do as well. The converter is a 6K8, and there is only one stage of i.f. (a 6BA6, or 6U7). The two i.f. cans at 455 kc. are taken from a disposals receiver, as is the 455 kc. b.f.o. coil and tuning capacitor. The detector is a 6AV6 and the audio output a 6AQ5, but a 6SQ7 and 6V6 would do just as well.

We used one half of a 12AT7 for the b.f.o. and the other for an S meter amplifier. The S meter, by the way, came from a 522 test set. Removed from its tin box, it is found to have an attractive face calibrated 0 to 9, which is ideal for S points. The antenna sockets and the speaker jack on the rear of the chassis are also ex-disposals.

First, identify the coil windings on the aerial, r.f. and oscillator coils. When you are quite certain of the connections, remove them from the transceiver, open them up carefully, and renew the wires, carefully noting the colour coding. We used red for B+, pink for plates, blue for grids, and green for earth or a.v.c.

Next, remove the tuning condenser and mount it on the chassis so that its shaft comes out exactly in the centre of the panel, which should be first attached to the chassis. The height of the shaft will depend on the dial you are going to use, but almost certainly this will be a vernier, so allow room for it. Cut three large holes beneath the tuning condenser to allow connection to the three sets of fixed plates.

The aerial coil, 6BA6, r.f. coil and oscillator coil are mounted down one side of the condenser, to afford short connections from the grid windings to the fixed plates in each section.

The mixer valve is mounted alongside the oscillator section of the gang on the other side. Leave enough room for the moving plates to open fully. In front of this are mounted the first i.f. coil, 6BA6, and 12AT7. The second i.f. coil and the b.f.o. coil are mounted in Indian file next to the 12AT7, and alongside them again, the detector valve, audio valve, and speaker transformer. The detector valve is placed at the front of the chassis to be near the audio gain control.

The circuit of the 4-7.5 Mc. tuner is quite conventional. The secondary of the aerial coil is connected between grid pin 1 of the 6BA6 and earth. Pins 2 and 7 (suppressor and cathode) are linked, by-passed with a 0.1 μ F. capacitor, and connected by a 100 ohm resistor to the top of the 5,000 ohm r.f. gain pot. The screen (pin 6) is also by-passed with a 0.1 μ F. and connected

to B+ through a 47,000 ohm resistor. The plate (pin 5) is capacitively coupled to the grid of the 6K8 through the gang, has an r.f. choke in series with a 10,000 ohm resistor to B+, by-passed at their junction with a 0.05 μ F. capacitor.

Signal is fed to the 6K8 converter valve, which is housed in an ex-disposals shield can, through the top cap grid. The cathode (pin 8) is earthed, and the screen (pin 4) by-passed with a 0.1 μ F. and connected to B+ through a 47,000 ohm resistor. The oscillator plate (pin 6) and grid (pin 5) are connected to the appropriate oscillator coil windings through small value capacitors. The oscillator plate is fed with 150 volts regulated from a VR150 in the power supply, decoupled with a 10,000 ohm resistor and 0.1 μ F. capacitor. (Unless this network is included, the oscillator will shift frequency if the cable connecting the receiver and power supply chassis is moved.)

The 6K8 plate (pin 3) is connected to the primary of the first i.f. transformer, the other end of this winding being by-passed with a 0.5 μ F. and connected to B+ through a 4,700 ohm resistor. The secondary of the transformer is connected to grid pin 1 of the 6BA6 i.f. amplifier valve, the other end of the winding being by-passed with a 0.05 μ F. and connected through a 100K resistor to a.v.c. The cathode and suppressor (pins 2 and 7) are earthed; the screen (pin 6) by-passed with a 0.1 μ F. and connected to B+ with a 50,000 ohm resistor, and the plate (pin 5) connected to the primary of the second i.f. transformer, the other end of this winding being by-passed with a 0.05 μ F. and connected to B+ through a 4,400 ohm resistor.

One end of the secondary of the second i.f. transformer is connected to diode pin 6 in the 6AV6, the other end passing through a 50K and a 500K resistor in series to earth. The bottom of the winding and the junction of the two resistors are by-passed with a 100 pF. capacitor, and from the junction audio is taken off through a 0.02 μ F. capacitor to grid pin 1, which has a 5 megohm grid leak.

A 100 pF. capacitor is connected between diode pins 5 and 6, and from pin 5 the a.v.c. voltage is developed. In the usual manner, a one megohm resistor is connected from pin 5 to earth, and another one megohm placed in series with the a.v.c. line, at the other end of which a 0.05 μ F. capacitor is wired to earth. (Varying the value of this capacitor will vary the speed of the a.v.c. system.)

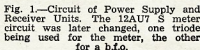
The audio section of the 6AV6 has the cathode earthed and a 120K ohm plate resistor. Audio is fed to the top of the volume control (a 500K pot.) through a 0.02 μ F. capacitor, and the moving arm goes to grid pin 1 of the 6AQ5. This is also wired conventionally, the cathode (pin 2) having a 300 ohm 3 watt wire wound resistor and

* 3 Bass Street, Kingsford, N.S.W.

A four-pin socket is used for the cable connecting to the power supply. Four pins are required for B+, 150 volts regulated, filament plus, and earth.

With the 7777 Kc. crystal plugged in the main shaft was tuned for maximum output at 139.9 Mc., and the shaft then locked into position. The trimmers on the frequency multiplier were adjusted for maximum oscillator output. In the mixer, a one megohm resistor was wired from grid to earth (replacing the negative bias voltage), a 15,000 ohm resistor placed in the plate circuit, and a 6C4 cathode follower wired in. The cathode follower has a 47K grid leak, 1.500 ohm

To align the aerial and r.f. coils, pump signal at 4 Mc. into the aerial with the gang fully meshed, and adjust



We had quite a lot of fun calibrating the two metre band, having logged to

(Continued on Page 16)

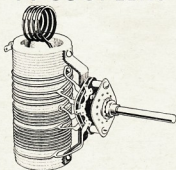
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RG58-AU 50 ohm Coaxial ..	2/6 yd.
PT9M 50 " " " "	1/10 yd.
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Type 4/112 for use with single ended tubes type 6146, 807, etc.

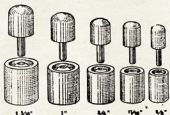
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7/16 in. " 22/-	1-1/4 in. " 48/-
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"Q-MAX" CHASSIS CUTTERS

SCREW TYPE

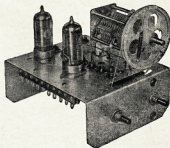
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SAVES TIME — GIVES PROFESSIONAL APPEARANCE

SIZES	SIZES
1/2 inch .. 27/11	1-1/2 inch .. 40/6
5/8 inch .. 27/11	1-3/4 inch .. 44/1
3/4 inch .. 27/11	2 inch .. 46/0
7/8 inch .. 30/10	2-3/32 inch .. 72/3
1 inch .. 36/7	2-1/2 inch .. 85/9
1-1/8 inch .. 36/7	11/16 in. Square 55/4
1-1/4 inch .. 36/7	1 inch Square 55/4
1-5/8 inch .. 40/0	21/32 x 13/16 in. Rectangular .. 76/2

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Price: £10/5/- plus 12½% S.T.

WILLIS AIR-WOUND INDUCTANCES

No.	Diam.	T.P.I.	B. & W. Equiv.	Price
1-08	1 1/8"	8	No. 3002	5/3
1-16	1 1/8"	16	No. 3003	5/3
2-08	1 1/8"	8	No. 3006	6/3
2-16	1 1/8"	16	No. 3007	6/3
3-08	1 1/8"	8	No. 3010	7/4
3-16	1 1/8"	16	No. 3011	7/4
4-08	1 1/8"	8	No. 3014	8/5
4-16	1 1/8"	16	No. 3015	8/5
5-08	1 1/8"	8	No. 3018	10/6
5-16	1 1/8"	16	No. 3019	10/6
8-10	2"	10	No. 3907	13/8

SPECIAL ANTENNA ALL-BAND TUNER INDUCTANCE

(equiv. B. & W. No. 3907-7")

7" length, 2" diam., 10 t.p.i., 24/6

References: A.R.R.L. Handbook, 1961;
"QST," March 1959;
"Amateur Radio," Dec. 1959.

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List No.	Audio Watts	RF Inp. Watts	Price inc. sales tax
UM9	10	20	£5/16/0
UM1	30	60	£7/9/9
UM2	60	120	£10/13/3
UM3	120	240	£12/2/6
UM4	250	500	on application

GELOSO 2620A FRONT-END RECEIVER TUNING KIT

Covers All Amateur Bands.
Price: £25 plus 25% Sales Tax
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AN EASY WAY OF LOGGING FOR R.D. CONTESTS

HOW do you make out, keeping track of whom you had worked and on which band, during the last R.D. Contest? Well if you had trouble like I did in 1961 and 1962, this may interest you.

I have tried many different methods, all of which have had many pitfalls and have proved highly unsatisfactory. Now let's reminisce over the last three years. Take 1961 for instance. Well, with 350 QSOs we ended up in quite a mess. I tried taking a slip of paper for each call area and as time went by I tried desperately to place in alphabetical order the stations worked. At the same time we ticked the adjacent columns representing the various bands. Alas, this was "no chop" as to speak. Sheer bedlam; as time went by it was obvious that the "system" was breaking down. Many the time was the reply, "sorry OM have worked."

Now in 1962 we really had it organised. It seemed, oh so simple, just obtain one of those "ideal desk calendars" and on working each station you arrange them in alphabetical order with call sign on top, band and your number alongside (i.e. 001). What a set-up. Couldn't miss. Just imagine the words spoken when the "Board of Control" in all her glory charged through the door, cup of tea in hand. The draught caused the papers to fly . . . Never mind, enough said!

Well it was close to the 1963 Contest and the position was desperate, something had to be found and found fast, too! Let us consider the basic requirements.

1. Something very simple and fast. (And probably most important.)
2. Not many pieces of paper.
3. Able to tell at a glance said station on that band.

I decided that you knowing what number you gave to a certain station was irrelevant if the "system" was "fool proof". Well enough of the preamble, here is how it works.

First of all you take, say, six pieces of paper about 15 inches square, and divide it into half-inch squares. Label it A-Z across the top, and A-Z vertically (downwards) with both "As" corresponding. See Fig. 1.

VK3 CALL AREA					
	A	B	C	D	→ Z
A					
B					
C					
D					
↓					
Z					

Fig. 1.

Label each piece of paper to represent the various call areas. Obviously you don't have to make up a sheet for your own call area, and suggested groupings are as follows: VK1 and VK2, VK3, VK4, VK5/8, VK6, VK7, VK9 and VK0.

Now if you work a station on 80 mxx you could use various colours, for designation, or do as I did, simply use the figure 8. For the other bands use 4 for 40 metres, 2 for 20 metres, 1 for 15 metres, and anything for the other bands.

Here's how it works. Let's take all possibilities. Say you work VK3AB on 40 metres. Remember always that the first letter of the call sign indicates the horizontal direction and the last letter indicates the vertical direction. It is hence logged as in Fig. 2, i.e. along A, down to B, with 4 meaning 40 metres.

VK3 CALL AREA					
FIRST LETTER					
	A	B	C	D	→ Z
A					
4					
B					
C					
D					
↓					
Z					

Fig. 2.

4 = VK3AB on 40 metres.

Now if you work VK3AAB on 40 metres, you would log as shown in Fig. 3. The "A" indicates the first letter and the same procedure is followed as for VK3AB. Get the idea? Simple, what?

You may well ask how to distinguish between VK0 and VK9 or VK1 and VK2 on the same sheet. This I leave to you and you could do as I did with say VK9AB and VK0AB (the possibility being fairly remote)—use different colours (red and blue biro respectively).

Well, in conclusion, I must say if you are careful and don't get the call areas mixed up, you will find the method highly satisfactory, extremely quick (able to call a station after checking in time before he has finished his CQ). Also it provides a good method of checking your final score, by simply counting up the number of 2, A2, etc., and multiplying that total by points for that call area.

The half-inch squares do not get too cluttered as 400 QSOs proved.

A fact is that he who knows whom he has worked whilst tuning the band, quickly generally nets high scores, everything else being equal.

Anyway, chaps, I hope this "system" is of some help to you and personal modifications can be made to suit the occasion.

Best of luck and high scores in the R.D. Contest.

VK3 CALL AREA					
FIRST LETTER					
	A	B	C	D	→ Z
A					
A4					
B					
C					
D					
↓					
Z					

Fig. 3.

A4 = VK3AAB on 40 metres.

N.B.—The "A" takes form of the middle letter. That is, "B4" for VK3ABB.

—Doug. McArthur, VK8KK, ex-VK5KK.

ELECTRICITY IN AUSTRALIA

This year, 1963, we celebrate the centenary of the first use of electricity in Australia, produced by batteries at the Sydney Observatory in June 1863. It is worth noting that in Australia, Tamworth (N.S.W.) had the distinction of being the first town to be lighted by electricity—this was in 1888. The records of progress reveal, strangely enough, that Sydney, in 1904, was the last of the capitals in this country to be electrically lighted.

—LIA-13042/BERS195.

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Mounted in HC6U Holders
Suitable for 455 Kc. I.F.s

Price £16-10-0 per Set
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RESULTS OF 1963 R.D. CONTEST

QUEENSLAND'S FIRST WIN

HONOURS for this year's Remembrance Day Contest go to Queensland for having won the trophy for the first time in the history of the Contest. The log return from VK4 was the highest ever for Queensland, and this is the contributing factor to the winning of the Remembrance Day Contest.

Generally, the standard of the logs was good and the Western Australian Division are to be commended in that all logs submitted were on the official W.I.A. log sheets. Unfortunately there are still a few logs below the required standard which were tolerated, but in future logs not up to standard will be disqualified. Several of the listeners' log received showed very little knowledge of the Contest Rules by the contestants.

All sections of the Contest were keenly contested and some fine individual scores were recorded. South Australia had the highest log average whilst Western Australia had the high-

est percentage participation. High scoring seems to be a regular occurrence from South Australia. Conditions for the Contest were not first rate and there was a lot of activity on the low frequency bands during night time operation. Another interesting feature of the Contest is the increasing activity on single sideband. This mode of operation is on the increase and a lot of contestants used it to their advantage on 80 metres.

The scoring system for the Contest appears to suit the contestants in all States, and it is indeed a pity that the two larger States cannot have a larger percentage of Amateurs participating in the Contest and submitting logs.

In conclusion, our congratulations once more to Queensland and hope that in next year's Contest we may see even more Amateurs on the air, particularly from New South Wales and Victoria.

—Federal Contest Committee, W.I.A.

NEW SOUTH WALES

Top Six Logs—

VK2AHM	.....	1205	points
2RS	.....	935	"
2AHH	.....	915	"
2BO	.....	805	"
2ABA	.....	733	"
2DO	.....	629	"

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK2AHM	441 1205	VK2AUC	70 160
2BO	301 803	2ADE	47 121
2DO	252 629	2DI	22 89
RVN	168 406	2AAB	26 49
2EL	136 437	2GJ	15 49
2AGS	116 237	2AHA	7 30
2YL	81 206	2AND	9 22
2HC	45 163		

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK2RS	325 935	VK2AEC	32 83
2AHE	294 915	2AHC	44 82
2ABA	292 733	2OE	30 76
2ANO	211 604	2AIA	17 70
2TS	234 467	2AI	41 68
2FE	170 400	2CK	24 65
2ALV	187 382	2APQ	40 63
2AFD	140 345	2XT	30 62
2ABE	123 306	2RU	30 61
2AXL	105 259	2RJ	30 61
2ARU	120 247	2AKX	25 51
2APE	87 222	2AKV	13 27
2AQJ	101 212	2AKL	5 20
2RX	56 208	2ASC	25 40
2HD	95 206	2ALA	20 38
2DM	77 157	2AWA	13 27
2AGZ	72 156	2AAJ	5 20
2GI	62 149	2CU	7 23
2ASH	53 148	2AAH	11 23
2AG	36 140	2AN	11 23
2AQX	57 137	2RA	9 22
2AIM	45 133	2AWX	10 22
2AZ	50 122	2E	6 19
2YN	53 122	2LA	10 18
2JL	52 107	2WG	10 15
2BW	45 106	2ACO	10 14
2AUL	50 106	2EH	9 12
2LV	44 103	2ADA	9 12
2RV	46 103	2ACQ/P	7 9
2AT	34 99	2ACQ/P/Log	7 9
2AGH	35 98	2ZSH	disqualified
2APO	32 92		

DETAILS OF STATE SCORES

	Total State Score	Aver. Top 6 Logs	Licenses	Log Entry	Percentage	State Aver.	Total State Points
New South Wales	18,162	869	1,427	107	7.4	169.7	2,230
Victoria	15,819	674	1,392	69	4.9	229.2	1,458
Queensland	16,564	469	469	99	21.1	167.3	4,197
South Australia	19,145	912	545	82	15.0	233.4	3,792
Western Australia	11,711	653	317	88	27.7	133.0	3,904
Tasmania	5,491	508	164	38	23.1	144.5	1,780

STATE TROPHY

Queensland	4,197 points
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Highest State Log Average

South Australia	233.4 points
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Highest Individual Score

VK5ZP	1,440 points
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Award Winners

Open—

VK1AB—G. Chisholm	22 pts.
2AHM—R. J. Whyte	1,205
3ALZ—I. F. Berwick	826
4DJ—G. F. Pooley	778
5ZP—J. McL. Vale	1,440
6RU—J. E. Rumble	727
7DK—D. H. Kelly	478

Phone—

VK1VP—E. Penikis	311 pts.
2RS—D. C. Harerecht	935
3MO—J. J. Williams	737
4WW—N. B. Walden	658
5WI—Operator VK5KK	
(D. A. McArthur)	1,032
6CL—J. H. Clinch	807
7AI—K. M. Saxon	657

C.W.—

VK1SG—T. A. Brinkley	145 pts.
2QL—F. T. Hine	517
3AXK—S. R. Coleston	448
4VR—L. D. Rickaby	386
5ZC—A. J. Penney	472
6SM—M. H. Saw	361
7SM—S. G. Moore	501

Receiving—

VK1A—A. Davis	389 pts.
L2211—R. C. Abernethy	883
L3138—G. N. Earl	717
VK4—K. Chiverton	506
L5015—W. J. Clayson	736
L6021—P. W. Drew	980
VK7—G. C. Johnston	951

AUST. CAPITAL TERRITORY

Open—

Call	Cont. Pt.
VK1AB	7 22

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK1VP	122 311	VK1HB	31 81
1AWU	51 106	1RS	11 45
1ACA/Loe		1GB	10 13
1KM	57 102	1ML	8 12

C.W.—

Call	Cont. Pt.
VK1SG	61 145

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK2QL	17 517	VK30Y	32 86
2APK	136 407	2EH	32 86
2YB	105 277	2JM	32 77
2GT	97 263	2ZQ	30 69
2GT	71 200	2FQ	30 69
2XQ	65 171	2GW	18 48
2EO	45 125	2HZ	10 24
2SL	45 124	2OT	12 23
2ZC	36 109	2IV	10 19
2SU	38 100	2ASJ	5 16
2PU	40 93	2ADG	6 11

VICTORIA

Top Six Logs—

VK3ALZ	.....	828	points
3MO	.....	803	"
3TL	.....	685	"
3AZZ	.....	638	"
3OM	.....	603	"
3AIT	.....	557	"

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK3ALZ	285 828	VK3QV	102 232
3TL	225 803	3AKN	103 216
3AZM	158 420	3AST	98 183
3KB	101 238	3HIL	24 69

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK3AXK	185 448	VK3KN	2 31
3XB	171 418	3VS	20 47
3RJ	89 222	3LC	20 46
3AFI	35 102	3YE	20 46
3ARX	37 98	3AND	21 40

Phone—

Open—

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK3MO	249 737	VK3YQ	81 183
3A2SS	60 639	3DY	49 189
3AM	256 603	3ANV	69 161
30IT	256 637	3PW	36 139
301T	185 653	3JACD	81 135
3ATN	125 646	3XKE	62 129
3ARJ	147 432	3ZQ	54 111
3RV	157 418	3VZ	46 109
3EPF	150 413	3ASV	23 23
3WK	143 367	3ANQ	41 84
3AFJ	164 367	3AEQ	32 78
3AM	101 359	3AHG	32 68
3AHJ	100 336	3WVW	23 63
3LW	120 333	3BA	29 63
3ZU	141 333	3PU	28 58
3ALP	120 330	3TE	28 58
3HG	113 300	3VF	17 51
3ASN	145 288	3AWF	9 28
3ABP	120 282	3AQL	14 26
3AMT	104 263	3XK	23 23
3AKX	101 248	3ARA	6 14
3VL	76 242	3AGD	7 11
3JW	100 215	3AKW	6 11
3AYD	91 210	3AHT	11 11
3GC	58 189	3AFP	10 10
3HE	70 193		

QUEENSLAND

Top Six Logs—

VK4DJ	778 points
4RH	778
4UX	759
4WV	658
4FC	645
4LT	606

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK4DJ	274 761	VK4FT	79 151
4RH	268 761	4PC	79 152
4UX	260 759	4PU	47 134
4TV	199 518	4CC	18 63
4ZB	121 416	4BB	7 11
4DB	77 186		

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK4WV	219 653	VK4AV	13 66
4HC	203 645	4RO	27 66
4LT	212 606	4XJ	21 27
4B	114 590	4XO	25 27
4QJ	213 559	4AQ	23 55
4CP	210 547	4DZ	39 55
4OR	152 577	4ID	16 54
4CS	181 486	4CZ	24 51
4BY	177 433	4W	20 47
4FY	187 423	4WL	16 46
4B	145 412	4PJ	16 46
4LB	152 376	4RL	28 45
4MW	114 289	4RG	21 44
4NB	102 287	4TW	16 39
4HH	72 262	4ZM	10 31
4QC	88 248	4ZR	8 30
4FN	91 205	4BQ	11 29
4B	82 180	4FW	11 29
4AN	78 171	4NG	9 28
4OL	70 166	4FE	12 28
4WV	60 184	4PS	12 27
4ZM	53 150	4MH	7 26
4KM	69 147	4HD	12 23
4BB	41 145	4CS	12 23
4LB	49 137	4JT	14 23
4DA	45 133	4ST	9 20
4B	40 130	4W	8 17
4CI	60 113	4PS/Log	
4ZW	51 105	4MF	10 16
4HA	22 85	4QW	6 14
4AJ	24 84	4SX/P	6 14
4ES	51 92	4V	6 12
4LN	36 91	4NS	8 12
4SD	29 90	4V	8 12
4WQ/Log		4ZY	7 11
4LN	35 78	4PR	9 11
4DD	29 76	4HZ	11 11
4EB	25 72	4GG	10 10
4WS	35 68		

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK4VR	146 386	VK4BL	11 24
4HI	92 245	4OJ	8 17
4JF	85 232	4CH	9 14
4I	81 254	4LY	8 11
4XP	50 116	4XL	8 9
4KX	31 58		

SOUTH AUSTRALIA

Top Six Logs—

VK5ZP	1440 points
5WT	1033
5ZK	898
5J	749
5FT	715
5WC/Log 5QX	688

Call	Cont. Pt.	Call	Cont. Pt.
VK5ZP	527 1440	VK5ZF	116 207
5ZK	193 613	5T	37 130
5TC	244 588	5JT	37 113
5JN	213 584	5FM	31 94
5BU	190 528	5HM	26 90
5RG	268 505	5YA	19 87
5QR	100 254		

Call	Cont. Pt.	Call	Cont. Pt.
VK5WI	400 1032	VK5SX	64 151
5ZK	316 858	5ZZ	62 150
5T	271 749	5GW	87 141
5FT	268 715	5BQ	54 137
5WC/Log		5MT	60 138
5QX	256 683	5ZQ	59 130
5MS	203 556	5DJ	46 122
5GZ	169 430	5WH	46 121
5TM	149 351	5OC	30 112
5W	146 249	5KY	25 104
5NN	101 241	5UP	47 103
5EQ	109 335	5IB	19 77
5LQ	109 335	5EP	29 52
5MP	138 333	5UX	21 57
5AX	137 332	5EH	22 34
5TN	126 326	5SR	20 33
5IQ	98 313	5ON	7 30
5OL	110 289	5SR	20 33
5TL	100 285	5SO	19 30
5TJ	73 238	5OZ	17 30
5LN	94 212	5CO	9 29
5KC	51 116	5SC	13 29
5BG	48 174	5WC/Log	
5RR	56 167	5TH	10 25
5DF	49 160	5WC/Log	
5CL	45 152	5BV	9 23
5LC	65 156	5CJ	10 22
5SS	74 155	5PM	12 15

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK5ZC	177 472	VK5PG	51 92
5LD	124 357	5SG	30 76
5NY	100 345	5H	19 68
5PC	108 252	5JQ	15 35
5FE	62 145	5RK	8 28
5Y	51 116	5LC	8 28
5OR	52 112	5BS	17 23
5TL	51 99	5FO	9 15
5KI	32 94	5BM	7 14

WESTERN AUSTRALIA

Top Six Logs—

VK5CL	897 points
5RT	691
5MK	691
5KW	660
5WT	536
5FL	562

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK5RU	285 727	VK5VK	68 174
5MK	276 691	5WI	33 91
5KW	253 689	5JK	28 91
5WT	202 536	5RR	31 80
5PR	202 502	5BN	29 73
5BE	195 409	5NP	10 22
5CW	146 371	6RU/Log	
5WU	118 305	5AW	7 18

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK5CL	316 807	VK5BO	17 39
5RY	285 727	5VW	16 37
5XR	170 435	5WV	15 36
5RE	144 383	5FP	15 34
5LR	126 313	5LM	12 32
5X	102 275	5MM	12 32
5WL	83 214	5MA	13 30
5AV	74 203	5YL	10 28
5LA	68 181	5RH	10 28
5JS	62 162	5LG	12 28
5HH	58 161	5RO	8 28
5NG	55 144	5SN	12 26
5G	51 135	5VW	12 26
5RG	37 107	5AG	6 23
5TX	35 102	5CE	6 23
5TK	34 102	5RI	7 20
5DI	33 94	5MR	8 21
5MO	30 83	5AB	7 19
5RY/Log		5BS	7 18
5CY	32 80	5RI	7 18
5CA	35 77	5SJ	7 18
5GP	25 71	5TL	8 17
5KH	28 68	5RY/Log	
5KJ	28 64	5WR	8 18
5DD	23 62	5RU/Log	
5KS	23 59	5WM	7 16
5BN	21 55	5RY/Log	
5CR	23 54	5OY	8 16
5DX	21 51	5HK	6 15
5RW	19 45	5LS	13 14
5TM	19 45	5XP	6 13
5BD	15 44	5DL/Log	
5TB	15 44	5DP	7 11
5AF	15 42		

Call	Cont. Pt.	Call	Cont. Pt.
VK5SM	129 361	VK5UP	20 45
5X	60 322	5JA	8 21
5TS	43 109	5MY	7 19
5AS	37 92	5DF	8 18
5ZO	30 78	5GM	7 13
5EZ	30 53		

TASMANIA

Top Six Logs—

VK7AI	697 points
7DL	501
7XK	471
7XJ	478
7KA	451
7SA	373

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK7DK	220 478	VK7JZ	17 40
7KA	161 451	7LZ	11 24

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK7AI	254 697	VK7DR	22 46
7SR	185 562	7JA	20 40
7SF	169 572	7CT	27 35
7JH	132 337	7BQ	11 31
7KH	108 241	7IL	20 31
7MX	108 261	7LR	7 29
7BS	97 195	7DW	9 23
7TT	67 124	7MX/Log	
7CK	22 109	7DR/Log	9 19
7KS	65 102	7JP	13 18
7RX	22 88	7JD	9 12
7BS/Log		7KS/Log	
7ZV	33 62	7DS	8 10
7ZW	20 59		

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK7SM	179 590	VK7JL	20 57
7RY	84 199	7RK	12 28
7BJ	30 86	7AG	11 22
7B	31 76	7H	8 18
7GV	27 74	7CH	5 14

PAPUA NEW GUINEA AND TERRITORIES

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK6RD	120 430		
6MT	8 29		
8AT—Check Log			

ANTARCTICA

RECEIVING SECTION

Australian Capital Territory

A. Davis	388 points
E. Davis	120
J. Watson	107

New South Wales

WIA-1.2211-R. C. Abernethy	853 points
1.2033-D. W. Shephard	511
1.2289-F. Bowden	548
R. Breckley	326
1.2022-D. Grantley	305
1.2241-T. E. Stewart	283
1.2094-A. Mulven	263
1.2259-P. Vernon	202
1.2061-B. J. Smyth	187
1.2198-P. Hickling	87
1.2283-R. B. Macintosh	44

Victoria

WIA-1.3138-G. N. Eari	717 points
C. Shaw	660
B. Baker	577
G. H. Hunt	559
1.3125-D. James	519
1.3127-R. F. Gething	501
M. Brane	477
P. R. Nesbitt	395
1.3074-J. M. Hillard	383
1.3158-N. G. Harrison	357
1.3104-N. Duncan	335
A. J. Wilson	329
1.3043-E. W. Treblecock	318
Philip	277
1.3156-G. Thomson	278
1.3055-M. R. Cox	271
1.3158-R. Harrison	245
1.3182-J. Rose	183
K. D. Schubert	107
1.3144-P. Gibson	70
1.3099-J. Johnson	38

(Continued on Page 14)

WARBURTON FRANKI

For Your Radio and T.V. Accessories



W.F. are now distributors of the Famous CANNON PLUGS

Types available from stock include:—

XL-3-11	3-Pin Female Line	9/6 + S.T. 12½%
XL-3-12	3-Pin Male Line	9/- + S.T. 12½%
XL-3-13	3-Pin Female Panel	9/6 + S.T. 12½%
XL-3-14	3-Pin Male Panel	7/3 + S.T. 12½%
XL-3-15	3-Pin Right Angle Female Line	24/- + S.T. 12½%
XL-3-42	3-Pin Floor Receptacle Male	9/- + S.T. 12½%
XL-4-11	4-Pin Female Line	13/- + S.T. 12½%
XL-4-12	4-Pin Male Line	12/- + S.T. 12½%
XL-4-13	4-Pin Female Panel	13/- + S.T. 12½%
XL-4-14	4-Pin Male Panel	10/4 + S.T. 12½%

Enquiries welcomed for other types.

METAL SPEAKER BOXES

Finished in Grey Hammertone Enamel.

Oval 5" x 3"	47/6	Round 6"	20/8
Oval 7" x 4"	57/6	Round 8"	23/4
Oval 9" x 6"	75/-	All Prices + S.T. 25%	

The round speaker boxes are open backed, but the oval ones are completely enclosed.

TRANSISTOR AUDIO AMPLIFIERS

PK 544. Five Transistors—push-pull output. Works from 9 volt battery. Low impedance input; output impedance 8 ohms. Boxed with circuit and wiring instructions.

100/- + S.T. 25%

BARGAINS!

● GANGED POTS

With d.p.s.t. switch, 2 meg. linear.

7/9 + S.T. 25%

● SILICON DIODES

400 p.i.v. at 1 amp.

6/3 each or 70/- doz. + S.T. 25%

● CHASSIS PUNCHES

Hammer Type. Locally made and guaranteed. Set of three, ⅜", ½", 1-3/16".
59/6 S.T.E.

● DYNAMIC MICROPHONES

High impedance with in-built stand.

24/- + S.T. 12½%

● AMERICAN TAPE

Irish Brand, 5" 1,200' Reels, Mylar Base.

47/6 inc. tax and postage

MATRIX BOARD

New Miniature Series

Hole size: 0.045", hole spacing 0.1".
Stock Sizes 3" x 3" 2/10 + S.T. 12½%
of Boards: 6" x 6" 9/6 + S.T. 12½%
9" x 9" 20/- + S.T. 12½%

Other sizes available up to max. of 34" x 24".

Hardware No. 253 Wedge Pin 9d. doz.
to suit: No. 285 Eyelet Tag 1/- doz.
No. 314 Turret Pin 7d. doz.

SOLDERING IRONS

Six-Second Push-Button Type

Uses screw-in copper tips and carbon elements. Supplied complete with transformer for mains use, or may be used from accumulator.

85/- S.T.E.

+ Pack and Post 2/6.

NEW - 2-W. TRANSISTOR AUDIO AMPLIFIERS

Completely encapsulated in Epoxy Resin. Size: 3½" x 2" x 1". Works from voltages of 4½ to 12. Output impedance 3.2 to 45 ohms. Leaflet supplied shows how to use as:—

- Stereo Amplifier. ● Stereo Converter.
- Intercomm. ● P.A. System, or as
- Signal Tracer.

£6 + S.T. 25%

+ Pack and Post 1/-.

2-STATION TRANSISTOR INTERCOMM. UNITS

Complete with connecting wire and battery.

80/- + S.T. 12½%

+ Pack and Post 2/-.

SIGNAL GENERATORS

LEADER—Combines Quality with Low Price

LSG10

Frequency Range: 120 Kc. to 260 Mc. (six bands) and Calibrated Harmonics 120 to 260 Mc.

R.F. Output: Over 100,000 Microvolts.

R.F. Control: Variable with two taps.

Modulation Frequency: 400 c.p.s.

A.F. Output: 2-3 Volts.

A.F. Input: Approximately 4 volts.

Valves used: One 12BH7 and one 6AR5.

Size: 6½" x 10" x 4½". Weight: 6 lbs.

Price £12/16/- + S.T. 12½%

Pack & Post: Vic. 5/-, other States 7/6.

- TRADE ALSO SUPPLIED
- OPEN SAT MORNING

Please include postage or freight with all orders.



WARBURTON FRANKI

359 LONSDALE ST., MELBOURNE — MU 8351



MICROWAVE TESTS

On 25th May, 1963, a group comprising VKs 3ZOV, 3ZAF, 3ZMQ, 3ZKC/T and Peter McKenzie carried out a series of microwave tests between Mt. Dandenong (2,040 ft. above sea level) and a point 18 miles away at Highett (140 ft. above sea level). All obstacle clearance criteria were satisfied and path opticality was also verified by sending a light beam from Highett to Mt. Dandenong with a 20-inch searchlight reflector. Stabilised equipment operating on the 3,300 Mc. allocation was used to determine the following:—

- (1) Median path attenuation.
- (2) Deepest fading over this short-term test period.
- (3) Path reliability using the result from (2).
- (4) Gain of several parabolic antennae and yagi systems.
- (5) Diffraction loss over trees of a green cross-section and height and agreement of theoretical diffraction loss with that obtained here.
- (6) Maximum available signal/noise ratio for a baseband of 4 Mc. (i.f. bandwidth 10 Mc.) and comparison with predicted figures.
- (7) The effects of system non-linearity due in part to (a) natural multipath propagation, (b) deliberately introduced multipath signals, as compared with test-bench linearity performance.

Parts (6) and (7) were intended mainly to help evaluate the overall long-distance behaviour of a flying-spot scanner video system which has so far only been used in conjunction with this equipment over a much shorter distance.

The 3K Mc. f.m. transmitter comprises a 100 mW. temperature-controlled klystron (726A) with an electronic regulated power supply. Fre-

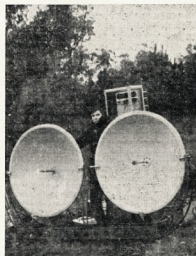
quency stabilisation ($\pm 0.01\%$) is absolute, using a temperature controlled reference cavity and a negative-feedback control loop. The klystron is matched to its load by means of a coaxial dielectric double slug tuner, giving a residual v.s.w.r. not greater than 1.5. A 3K Mc. a.m. transmitter is now available which delivers an average output power of 50w. and a peak power output of 45kw. using pulse modulation.

The 3K Mc. receiver uses a single-ended coaxial crystal mixer with matching facilities and a temperature controlled local oscillator klystron. The l.o. may be reference cavity stabilised as before, or "locked" to the transmitted signal. Twelve i.f. stages follow the mixer, including three limiters and a wide-band discriminator. Base-band (4 Mc.) and single voice channel (10 Kc. bandwidth) amplifiers with cathode follower output, together with a receiver tuning error-signal feedback loop follow the discriminator. This mixer-i.f. chain combination is in duplicate for space or frequency diversity facilities. The receiver noise figure is 14 db. with r.f. preselection, good mixer matching and approximately 500 μ A. of crystal current.

Equipment for 5K Mc. is similar but uses a Heil tube transmitter delivering 500 mW., or alternatively an a.m. c.w. magnetron delivering some 300 mW., with a wide-band a.m. i.f. strip. The 10K Mc. system using 723A/B klystrons and wave guide r.f. components is essentially similar to the 3K Mc. system, but with a power output of only 15-20 mW. when the klystron tuning struts are modified.

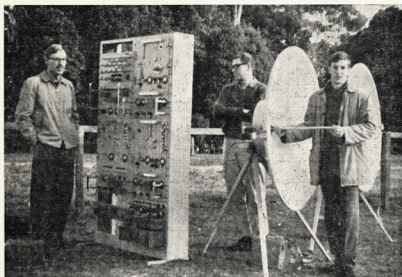
The antenna system is common to all bands and consists of one or two 4 ft. tripod-mounted paraboloids with dipole or horn wave guide feeds as required.

The equipment at both ends is basically similar, and both are capable of handling a video signal on all microwave bands. Mains and all h.t. supplies to this equipment are stabilised. This is essential for avoiding unnecessary errors in the path analysis. Available test equipment includes power measuring bridges, a standard horn, a slotted line, frequency meters and calibrated attenuators.



Mt. Dandenong gear and John VK3ZAF. Not shown, but present, was Peter McKenzie.

For the Mt. Dandenong test, the overall discrepancies between theoretical and actual results were not greater than $\pm 3\%$. The path attenuation at 3K Mc. was measured as 134 db. with a maximum recorded fade of 12 db. The maximum available (unweighted) base-band S/N was 38 db. The single voice channel f.m. improvement over



Gear at Highett. Left to right: Martin VK3ZOV, Michael VK3ZKC/T, and Graham VK3ZMQ.

Wireless Institute of Australia
Victorian Division

A.O.C.P. CLASS

commences

MONDAY, 10th FEB., 1964

Theory is held on Monday evenings, and Morse and Regulations on Thursday evenings from 8 to 10 p.m.

Persons desirous of being enrolled should communicate with—
Secretary W.I.A., Victorian Division, P.O. Box 36, East Melbourne (Phone: 41-3535, 10 a.m. to 3 p.m.), or the Class Manager on either of the above evenings.

this figure was approximately 20 db. In these tests a two-channel, six-speed strip chart recorder was used at the Mt. Dandenong end. One tree in the far-field of the antenna caused a diffraction loss of 15 db., and measured absorption losses for several bushes and trees were also in this region.

The r.f. portion of the link was initially adjusted at both ends by means of frequency meters, whilst prismatic compasses were used for dish alignment. Some fifteen minutes were then required for finer link adjustments. The initial frequency difference at either end by this means of link frequency alignment was measured as less than half a megacycle.

After carrying out surveys for Fresnel clearance last year, more extensive microwave link equipment operating on 3K, 5K and 10K Mc., together with a flying spot scanner television system, was set up last January at Mt. Macedon (3,300 ft. above sea level) by VKs 3ZAF and 3ZKC/T and at Arthur's Seat (1,050 ft. above sea level) by VKs 3ABY, 3ZMQ, 3ZIX—the path distance being 70 miles. Due mainly to a failure in the six metre liaison equipment and some unusual difficulties on Mt. Macedon, the two-day operation was unsuccessful.

A number of long-distance (50-200 miles) microwave paths have been examined and several of the shorter-distance paths comply with the "first Fresnel zone" clearance and also the "50 ϕ D" criterion for path obstacle clearance requirements.

The main technical problems at present are lack of heavier transport for the equipment and petrol or diesel alternators for reliable power. It is for these and other reasons that we have been forced to postpone further experiments, at least until a suitable solution is found. Certain simplifications will also be made to reduce the overall weight of the equipment.

Responsibility for maintaining reliable 2 metre liaison lay in the capable hands of VK3ZAF and Peter McKenzie (Dandenong) and VK3ZMQ (Highbett).

The Highbett end of the link was erected on sloping ground outside the VK3ZMQ QTH.

Our group also gratefully acknowledges the co-operation of the HSV7 management and the HSV7 transmitter staff on Mt. Dandenong.

Although our aims were primarily those outlined previously, this microwave QSO will be claimed as an official two-way Australian v.h.f. record for the 3,300 Mc. band.

—M. L. Oliva, VK3ZKC/T.

ROSS HULL MEMORIAL V.H.F. CONTEST

Please note the following amendments to the scoring table of the above Contest:—

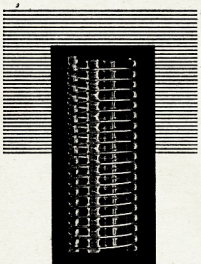

Delete 288 Mc.—Withdrawn from Amateur Service from 1/7/63.

Insert 420 Mc.—From and including 1/1/64. Scoring for 420 Mc. contacts will be identical with that shown for 576 Mc.

576 Mc. Band: It has been erroneously stated in some quarters that this band is not available after the end of December 1963. Page 6 of the current issue of the Call Book states that 576 Mc. band "is allocated on a temporary basis until required by the Broadcasting Service." As no advice of such requirement has been received from the Australian Broadcasting Control Board, this band is still fully available to the Amateur Service.

R.D. CONTEST RESULTS (Continued from Page 11)

Queensland			
K. Chiverton	...	505	points
WIA-L4018—C. H. Thorpe	...	433	"
W. Whiteway	...	308	"
L. O. Tully	...	282	"
12233/VK4—R. Erwin	...	188	"
L4011—G. Milner	...	196	"
L4025—R. E. Rumble	...	174	"
L4031—J. L. Kelly	...	107	"
L4023—C. Paton	...	104	"
L4010—G. V. Frank	...	90	"
VK4ZGD—Ineligible Log.			
South Australia			
WIA-L5015—W. J. Clayton	...	736	points
L5049—D. DeCean	...	587	"
P. J. Usher	...	409	"
L5020—F. W. Ashlin	...	401	"
L5058—G. Bolt	...	259	"
D. Murdoch	...	278	"
R. Whellum	...	157	"
Western Australia			
WIA-L6021—P. W. Drew	...	980	points
L6005—D. S. Pratt	...	522	"
L6010—H. J. Thompson	...	215	"
Tasmania			
G. C. Johnston	...	951	points
R. Balfour	...	887	"
R. J. Mutton	...	424	"
S. Cooper	...	203	"

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S.S.B. TIPS

THE SWAN TRANSCEIVER

This is not meant as an advertisement for the Swan manufacturers, they really don't need it, as anyone knows who has heard their sets on the air. The block diagram (Fig. 1) gives the general outlay. It has been re-drawn from the operating manual's picture, where it is not too clearly presented.

The circuitry is very simple, they originally used a hybrid crystal filter on 5775 Kc., now have changed to approx. 5,200 Kc. in the newer tri-band versions, so that the 20 and 80 metre American phone bands are covered with one v.f.o. frequency range.

The v.f.o. is a type Colpitts circuit. Its frequency is doubled in the plate circuit for 20 and 80 metres, and tripled for 40 metre operation.

S.S.B. RECEIVER A.V.C. AND PRODUCT DETECTOR

Many, and some very complicated, circuits have been published in the past and I wonder whether the fairly simple circuit used in the Collins KWM2 is sufficiently known. It is shown in Fig. 2.

One tube, the 6BN8, does the entire function of a.v.c. rectification and product detection. Evidently Collins is not afraid of b.f.o. voltage leaking back into the a.v.c. rectifier section and upsetting the (delayed) a.v.c. action. Note the small resistor from grid to ground in the product detector!

In addition, they control the r.f. gain of the receiver in the same grid circuits of the r.f. amplifier and two i.f. amplifiers, where the a.v.c. voltage is applied, with an adjustable negative bias.

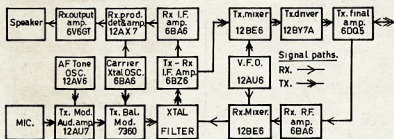


Fig.1. BLOCK DIAGRAM "SWAN" TRANCEIVER.

None of the r.f. circuits in the set are switched in going from reception to transmission, not even the antenna! The p.a. plate circuit serves as a tuned input circuit for the receiver r.f. amplifier.

The change-over relay applies a 90 volt negative blocking bias on the tubes in the set's stages not being used, and also opens the plate voltage supply to the same stages.

The oscillators are permanently connected to both the receiver and transmitter mixers and the input to the crystal filter; likewise to both the balanced modulators and to the receiver mixer, as well as the output of the first i.f. amplifier to the next two stages. This seems to do no harm at all and certainly simplifies the transceiver.

Where the S meter of the receiver works on the screen current of the first i.f. amplifier, this control affects the S meter reading just as in most receivers, but the received signal still continues to register on the S meter in the normal manner and to the original strength indication! So one can actually read the strength of the peak signal level by backing off the r.f. gain till the S meter just barely kicks on the peaks of the received signal.

AMPLIFIED AUTOMATIC LEVEL CONTROL (A.A.L.C.)

There are as many ways to apply a.l.c. to a s.s.b. transmitter as there are perhaps methods of applying a.v.c. in a receiver—delayed, hang-on, amplified and what have you. It all boils

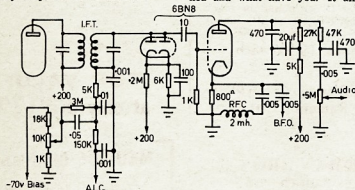


Fig. 2. COLLINS AVC-PRODUCT DETECTOR.

down to feeding a bit of the output voltage rectified back to one or more control stages earlier in the set.

Hallcrafters, in their new s.s.b. transceiver SR150, apply what they call something new, **amplified** automatic level control, not **load** control, as erroneously mentioned several times in the s.s.b. column in June '63 "A.R." On first sight there seems nothing new, just as in a receiver where one can amplify the signal in a separate stage before rectifying for a.v.c. voltage. But there is a difference.

Hallcrafters no doubt figured that if their twin output tubes are operating in AB1 up to the point of grid current flow, there should be plenty of output and to obtain even more would require extensive measures of final drive regulation, etc. So why not limit the drive to the final amplifier to just that point of grid current flow?

To do this, they include a fairly large resistance in the return of the final amplifier grid circuit to the negative bias source and only provide by-pass for r.f. As soon as grid current flows, a small audio voltage will appear on this resistor. This audio voltage is fed to the grid of a triode, amplified and rectified with a pair of diodes. The resultant rectified voltage controls the grid of the r.f. stage after the crystal filter.

In that manner, with proper control of the a.a.l.c. time-constants, only a fraction of a phrase will draw grid current and immediately the gain of the set is reduced. The result is a perfectly clean signal with hardly a trace of distortion products. Worth duplicating!

—Arie Bles, VK2AVA.

NEXT FEW ISSUES OF "A.R."

Readers should note that the January 1964 issue of "A.R." will be printed early in December 1963, and should be received in your mail box about late December. The February 1964 issue of "A.R." will be printed early in December, due to the fact that our Printer will be closed during January. As a result of this, it was not possible to print any DX, V.h.f., Sideband, S.W.I., Y.R.C., Federal or Divisional notes, nor any Hamads. This edition will be a technical issue without any other features. It will be mailed early in February 1964, hence you may not receive it in your post box until mid February. So please do not write in complaining that this particular issue is late.

Publication will return to normal with the March 1964 issue, for which all copy should be received at P.O. Box 36, East Melbourne, C.2, by the 8th February, 1964.

"IT HAS BEEN SAID"

The D.X.C.C. "rat race" seems to cause participants to forget some of the Amateur Code. The latest development was overheard at a station where arrangements were being made for a sked to be made with a DX station where activity is limited, for an American station, the operator of which was absent from the U.S. Another Amateur was to operate the station of the absentee for the sked. Fortunately A.R.R.L. have caught up with some of the questionable practices from time to time and disallowed claims for credit.

TWO-BAND RECEIVER

(Continued from Page 7)

date stations stretching from 144.01 to 146.26 Mc. Fortunately, the dial "expands" as we tune up the band.

POWER SUPPLY

As remarked earlier, the power supply contains two separate supplies, one for the transmitter and modulator, and one for the receiver. The front panel contains a switch for 240 volts a.c. to each supply, a pilot lamp, and a meter calibrated 0-200 mA. This meter reads the total current drain of the receiver supply, which is 100 mA. on h.f., and 130 mA. on v.h.f.

The receiver supply consists of a transformer providing 250 volts a side at 150 mA., with a 5Y3 and a capacity input filter. Under load, it provides 275 volts d.c. A resistor drops this for the VR150, which provides 150 volts regulated for the h.f. oscillator. The centre-tap of the h.t. secondary and the shield are earthed by a relay, which open circuits the earth connection on transmit. The transformer and capacitor are new, but the valves, chokes, sockets and resistors are ex disposals.

The transmitter supply is made up of disposals gear. The transformer came from a p.a. amplifier ("Now hear this!") and provides a h.t. winding tapped at 380 volts a side, and 230 volts a side. The filament transformer has two 6.3 volt and two 5 volt windings. Thus we were able to provide two h.t. outputs, each using a 5U4. One provides about 350 volts d.c. through a 100 mA. choke input filter, the other about 250 volts d.c. through a capacity input filter. The larger voltage will be used for the p.a. of the transmitter (probably a QEQ03/12) and the modulator (perhaps a 6N7); the lower voltage for the exciter and pre-amp. stages. Current from the major transmitter supply will be read in the p.a. meter and/or modulation meter, so there is no need for a meter for this on the power supply panel.

The receiver chassis is placed in the bottom compartment of the tabletop

cabinet, which places the tuning knob convenient to the hand. The power supply sits in the centre compartment, and the top compartment will hold the transmitter and modulator. The cabinet is made of 8" x 1" maple, and measures 19" high by 15" wide. It will be given a coat of undercoat and painted grey enamel. All cable connections are made at the rear. A six-pin socket is used for the transmitter power supply, merely to distinguish it from the receiver supply.

OBITUARY

MALCOLM PERRY, EX-XCP

Malcolm Perry's death on 8th October took from the thinning ranks of Wireless Pioneers one who had been active in the Wireless Institute since its foundation in March 1910. He followed Wal. Hannam (active still as VK2AXII) as Secretary of the Institute when Wal. departed with the Mawson Expedition for service in the Antarctic in 1911.

The Official Call List of the Wireless Institute of N.S.W.—as it was then called—indicates that Malcolm operated a spark transmitter under the call of XCP. All pre-World War I Amateur Call Signs commenced with the letter "X".

Resumption of Amateur activities in 1910 saw Malcolm very active in handling Wireless Institute affairs. Interesting reports of lectures given at the Institute meetings appeared in detail in the magazine "Sea, Land and Air," which was well known and remembered by all genuine old timers of those days.

Malcolm attended both openings of the Dural Station and the Wireless Centre at Atchison Street. This memorable occasion has been recorded in colour film as he chatted with Chas. MacLurean (VK2CM) and Jack Pike (VK2JP), who may even now, be swapping reminiscences of the foundation days of Amateur Radio with Malcolm in the Spiritual Lands of the Great Brass Foundry.

JACK FERGUSON, VK2FJ

One of the real old timers, Jack Ferguson, VK2FJ, was prominent in the affairs of the Old Waverley Radio Club in days gone by. Since the war, in his retirement at Saratoga, he was very active on 10 and 15 metres. A great worker and supporter of the Central Coast Section of the Institute, N.S.W. Division, Jack will be sadly missed by all of us.

TO YOU, THE READER

On behalf of the Publications Committee of "A.R." it is my very pleasant duty to wish you, the reader, and your family, the Compliments of the Season.

It has been with your assistance that your magazine has been published for yet another year, as it is the readers who maintain the continuity of publication, because it is your activities, both technical and personal, which makes the contents of "A.R." So it is very sincerely that we wish you a Merry Christmas.

—Ye Ed.

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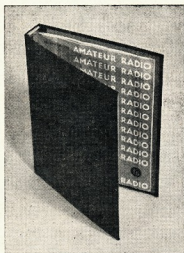
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H F

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Sub Editor: LEN POYNTER, VK3ZGP.

14 Esther Court, Fawkner, N.15, Victoria

ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB EDITOR

The DX season is about to commence and attention will be focused on what will be the last year of 50 Mc. Channel 9 in Melbourne is scheduled to begin test transmissions on 1st April, 1964, and a new era in t.v. and i.t.v. will begin. This DX season will occur during the summer months and many will be interested in its outcome.

It is hoped that the peak of the season will occur during the Ross Hull Contest when the numbers using the bands will be at a maximum. Because of this, your operating technique should be at maximum and all the courtesies of an Amateur operator should be extended to your fellow Amateurs. The use of excessive modulation should be avoided and the v.f.o. should be used with discretion. These courtesies make for easier operation all round.

Don't forget that there are many stations operating above the first 500 kc. and time that section. You will be surprised how many stations operate high in the bands.

So far it appears 8KK will be operating from Alice Springs. (Refer VK3 notes, 32ZU/P last heard of in the Simpson Desert, will probably be back in VK3 early in Dec. No news is known of any other special activity this season.

Of interest was the VK4-JA opening on Sept. 18 when JAs 1-6 were worked in VK3 between 1500-1800 S.A.S.T. Many VK3s were worked first JAs. On Sept. 28 32U/P in Gippsland heard one JA but could not raise him—who said the band was dead!

Of special note to all correspondents. Please forward your notes to reach me no later than 2nd of each month. Due to the editorial set-up all the notes must be in earlier and I must meet an earlier deadline. Any notes reaching me later than the 2nd cannot be considered, so keep the good work up and remember the earlier date. For future reference, there will be no v.h.f. notes appearing in the Feb. '64 issue, but please forward me your notes as usual.

I would like to take this opportunity of wishing you all the very best wishes for Christmas and for the coming year. I trust that you all enjoy running DX during the Christmas period. What band. Don't forget 420-450 Mc. next year and look forward to hearing of your successes.

Those using 420-450 Mc. after 1st Jan. for Ross Hull Contest should use the points for 576 Mc. section and include them in your score. All stations participating in the R.H. should send in a log no matter how small the score. 73. See you on 50 Mc. during the Contest, 3ZGP.

C.S.—Welcome to Reg. 22MR, new writer for VK2 this month.

NEW SOUTH WALES

John 2ANF's October meeting lecture seems to have an effect around the band, with a lot more stations using phase modulation, also some have been building discriminators. Last check on those using p.m. or f.m. are 2ANF, 2DR, 2ZAR, 2ZRG, 2ZKP, 2ZCF (50 mhz), 2ZNF, 2NC (has one, but won't use it, how about 1st John?), 2ZNS (if it will), 2AQA (50 mhz), 2ZAV, 2ZBL (46 Mc.), 2ZGB.

All VK2 users are reminded from time to time that the first 100 kc. of 144 Mc. band, by gentlemen's agreement, is to be used by country stations trying to work into Sydney. It seems this agreement is not being kept by a few signals I have been hearing lately.

John 2ZAV's lecture on 432 Mc. at Nov. meeting was well attended and absorbed by all. The Blue Mountains and Newcastle boys were also represented. Don't forget the v.t.v. auction at Wireless Institute Centre on Friday, Dec. 6.

The Jamboree-on-the-Air seemed a fairly successful event on v.h.f. I counted 15 stations on 2 mhz in Sydney; at Newcastle area, 2ZKW and 2AKP were active. Charles Hunt 1229 received his call sign and is now 2ZLE. 2ZSB is smoking cigars and throwing parties in celebration of working Wollongong. 2ZKW is working on 50 Mc. for the coming year.

Bob 2OA is on the sick list, and has had to give up activities in the Institute for a while. Sorry to hear this Bob, but hope to see you soon. The Oct. 1st contest on 50 Mc. as the fox, resulted in Lance 2ZKP with Bob 2ZAR taking first place, David 2ZVW and Mark 22H second, and Paul 2ZPS third, 73, 2ZMR.

VICTORIA

The first item of news this month is that the V.H.F. Group will be holding the second V.h.f. Get-together for this year. It will be held at Warrigal Park, at the end of Bell Street. There will be talk-in stations on six and two metres, both a.m. and net freqs. will be used. Council has donated a sum of money to buy some v.h.f. transmitting tubes which will be awarded as prizes, so on Dec. 1 bring your YL, XYL, and a picnic lunch to Warrigal Park at 11 a.m. and enjoy yourself.

The Field Day held on 20th Oct. was very successful with 18 portable stations out. The 2 mhz band gave some good QSOs to VK3 on the day, with 3CS, 5ZHL, 5ZEV and others being worked. At the moment the place getters are 1, 3ZRP/P; 2, 3ZOB/P; 3, 3ZAV/P; 4, 3ZJY/E.

DX later in VK3 has mainly been in the VK3 area, although some VK1s have been worked on 2 mhz. On 6 mhz 42AX was worked recently while a few weak signals have been heard to the north as everybody waits for the DX to break and the contest to start.

Neil 3ZRT at Caulfield is a newcomer on 2 mhz and is putting out a fine signal for his 15w, and a dipole. David 3ZPF is now on two with 30w, and a 4 el. beam. Norrie 3NM is also new on two. Jim 3ZCE (Frankston), who fights the DX back with a stick, is now on six with 30w and a 6CK8 and 3 el. beam. Peter 3ZPC hopes his things with his new rig and 10 el. beam. John 3ZLG is back on 6 and 2 with a 30 ft. mast and celebrated by winning the 6 and 2 mhz scrambles. Al 3ZCK (St. Kilda) has tamed his jumpy carrier and will soon be on a.m. Bert 3KU and XYL Peg at Kilmore have been putting a fine signal in Melbourne on 2. Peter 3APD is active on 2 mhz, we think a fugitive from 80 mhz QRN. Max 3ZCW has now a solid signal on both 6 and 2 mhz. Rod 3ZJW has been threatening locals with the idea of 100w, and 4 ten-el. yagis. Stan 3ZPL (Moe) has been active around Melbourne on a 2 mhz mobile. Graham 3ZMQ has been very active of late only he has not been doing the talking, Maxine, his YL, has more or less taken over his rig. 73, 3ZNJ.

SOUTH AUSTRALIA

50 Mc. Biggest news here is that Douglas 8KK formerly KX1 Alice Springs is back on 50 Mc. He is working at 5AL and we hope to hear him in the coming season. Frequencies and equipment details are so far unknown, but it appears that Doug is not using the big,

big Adelaide rig (4/250A). Probably his mobile is in use (832A).

After the sensational JA opening in Sept. this month has been quiet. New chums on include 5JX (50.025) and 5ZDH. New mobiles are Brian 5ZCO, Ian 5IK and Jack 5ZJT.

During the Labor Day week-end (12th Oct.) the Mt. Gambier V.h.f. Society went portable on Mt. Edward and worked Adelaide stations (200 miles) as follows: 5ZDR, 5ZMK and 5ZDY as well as hordes of VK3s on 6 and 2 mhz.

52NK is a new man at Virginia (40 miles north) who has been working into Adelaide.

144 Mc.: The onset of warmer weather has provided us with a few tropo. openings on this band. On Oct. 19 5ZDR worked 3AGV (Colac) and 5ZEV (Bendisham, 180 miles), also 2ZAV mobile on Mt. William in the Grampians. Fort Pirie, Crystal Book and Whyalla (all about 130 miles) have been worked from Adelaide quite a lot recently.

Bob 5RG (formerly 5RO) has been on 2 mhz lately using a 5GR52. Cor 5ZKC has his full licence—5CW. We assure you that the beacons will be on either 144.5 or 144.8, and once it changes to the higher frequency it will probably stay there. In the meantime, play it safe and tune both frequencies. The 6 mhz beacon will remain unchanged on 50.50 Mc. 73, 5ZCR.

TASMANIA

50 Mc.: Nothing out of the ordinary cooking on this band at the moment, but one or two signs of building gear in readiness for the coming DX season.

144 Mc.: There have been a few openings to VK3 from the north during the past month and VK3 and VK2 have been heard in Burnie. Activity is ever on the increase with 17 stations now active in the south and about 10 or 12 along the north coast, with new stations coming on nearly every week.

At our last meeting (October) we had a visit from Sed Tanner, VE1BBI, who hails from London, Ontario, and is teaching temporarily in Hobart at the moment. 73, 7ZAV.

FAPUA

Only signals heard during the month were the trans equatorial scatter stations on 49.9 Mc. These signals reached S9 on four nights and were audible on a total of eleven nights. 5ZBV is active most evenings between 5 p.m. and 9 p.m. 9CK has not been heard lately, and a new Z call should be on the air in the near future. 73, 5ZBV.

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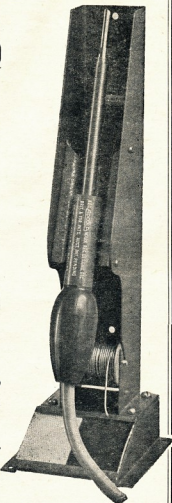
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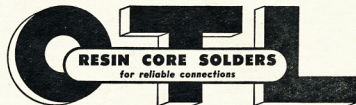
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Test, Disposals, Competitions, QSL Bu-
reau and Demonstrations.

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XYL and Harmonics Free

SW

Awards: Here are further details of the Heard All VK Award. One card from the following are required to enable you to become eligible for this award: VK1, VK2, VK3, VK4, VK5, VK6, VK7, VK8, plus one card from Christmas Island or Cook Keeling VK9, one from Nauma or Norfolk Island VK9, one each from Territory of New Guinea, Papua VK9, one from Macquarie or Heard Island VK9, plus one from the Australian Antarctic mainland.

Erie Tribblecock is our awards manager and all applicants should send their QSLs to him, but don't forget to include return postage. Our other award is the D.X.C.C., and we are going to have a special certificate for this. When you reach 200 countries confirmed let us know and you may be presented with DX200 award. This one is only a suggestion at the moment, but we think that you will agree that it is not a bad idea. The awards will be available early in the new year for certain.

Congratulations to the award winners in this year's National Field Day Contest in the receiving section. It is pleasing to see so many entries for this contest. After a slow start this contest is rapidly becoming more and more popular each year. Congrats to you, Erie, for maintaining the VK3 S.W. Group in the Contest. Owing to other commitments I will be unable to carry on with these notes in the new year and I would like to thank all contributors.

VICTORIA

Our Annual Xmas Wind-up will take place on Friday, 13th Dec. So come along and wind up the year. The prizes and Soft requirements will be available during the evening. Maurice has been up to his neck with work, however, the VK3 S.W. Group is still going. The bands. Greg 12138 has been busy fishing in between the DX. He has been rewarded already with his new 50 Mc. converter, as he has heard some VK4s. Neil Duncan is at the moment very busy studying for his ticket. Yours truly has found conditions fair at times. We have heard several weak unidentified signals on 25 Mc. one night. T8RAN has been heard on 14 Mc. s.s.b. Greg recently heard what he thought to be a VK7 and a ZL on 50 Mc. However, it turned out that they were on 50 Mc. (His converter i.f. is 7 Mc., so can anyone help him with the answer on this one.)

NEW SOUTH WALES

The monthly meetings are gradually getting more support from members, who are benefiting greatly by the talks and the discussions that take place during the evenings and over supper which always terminates our happy and informative get-together.

Radio New Zealand welcomes reports from overseas listeners. All reports are acknowledged by QSL card. All reports should include the wavelength, date, time, and if any, details of interference. Radio New Zealand programme to Australia from 1900 to 2145 E.A.S.T., ZL7 on 49 metre band, ZL2 on 31 metres. Address Radio New Zealand, Box 2396, Wellington, C.I. New Zealand.

Radio Amateurs' Notebook from the Voice of America can be heard at 1845 E.A.S.T. Sundays, 31 and 41 metre bands. Radio Canada S.W.I. Sessions, 1730 E.A.S.T., Sundays, 49 metre band.

Ross L2233/VK4 is using a National TEST with a 5 S.W. aerial. In the R.D. Contest he managed 190 points. Sid L2258 has an AMR30 but is having trouble with the coils at present. The 13th Dec. will be spent in the field in the phone section of the recent VK-ZL Contest and in that short space of time managed a good score, plus four new countries. Don's latest card to hand is from LU4ANB. Congratulations on receiving your award for the 1963 ZL Memorial Contest.

Now is the time to make sure your v.h.f. gear is working, as the Ross Hull Contest will soon be under way. Thought for the month: Work safely, don't become a ghost of your former self. T3, Chas. Abernathy.

QUEENSLAND

It is very pleasing to see our Sunshine State on the air. Geoff AF6N 12138-67 has been away on his Gulf trip, and of course has not been able to listen on the bands and because of this he is unable to get his name off in confirmed. Pleased to have heard from you again AF6N.

Chas. L4018 enquires about the VK Award. Pleased to hear from you Chas, who has a very fine list of awards that he has won over the years. They include: R.S.G.B. 21-28 Mc. Contest 1959; The Elizabethan Award, 1961; VK-ZL Contest 1956-57; National Association of Armchair Adventurers; Edmond Amateur Radio Society W5, 1961; National Field Day, 1960-61; R.D. Contest, 1957; Oregon Centennial Call W7, 1959; Ross Hull Contest 1958-59-61; All Japan Districts; Heard All Continents; Diploma Ribatyo, 1957; Heard Zone 4, 1963, and several more.

WESTERN AUSTRALIA

Peter L621 put up a good score in the recent VK-ZL Contest. On the broadcast band Peter has been hearing some other choice DX, such as Germany, Belgium, Monaco, India, Philippines, Egypt, South Africa, Yugoslavia, Vatican, New Zealand, Austria, Singapore, The Monaco station runs 400W. Thanks very much Peter on the offer of that magazine and will be happy to see it.

Was pleased to receive a letter from Ken, another keen S.W.I. in VK3. He finds the forwarding of s.w.l. reports by direct mail a bit on the expensive side and was interested to know if other members QSLed direct or through the Bureau? Direct is certainly the best way to send them, but as you said it is a bit expensive to send many that way. A number of S.W.I.s. do send their cards through the Bureau.

Now come on you other VK6 boys, let's hear from you, and so join us on our monthly page. May 1964 bring you much happiness and good luck. Merry Christmas to you all. T3, Mac Hilliard.

DX LADDER

	Countries	Zns.	S.s.b.	W.
Conf.	Hrd.	Conf.	Hrd.	W.
E. Tribblecock	261	289	40	—
D. Grantley	115	268	38	20
A. Westcott	91	268	38	20
M. Hilliard	83	234	33	32
M. Hilliard	83	234	33	32
M. Cox	80	231	30	47
P. Drew	75	212	28	31
C. Abernathy	70	202	28	30
N. Harrison	49	129	30	5
L. Thomas	41	130	20	16
G. Earl	34	122	18	16

—Mac Hilliard, WIA-13074.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

Editor "A.S.W.I. RADIO SCHEME"

During the past month, this has been said and done for the Youth Radio Scheme. Has anyone ever considered giving assistance to S.W.I?

There would be no need to promote an interest in radio for that is already there. In interest that could be furthered no end if assisted.

I must admit that on occasions by invitation we have had talks by full members, which we have been well received. I am seeking information should not be in an institution such as ours. I feel sure that we could retain some form of membership, gradually disappear from the ranks if some medium of tuition was organised by the full members of the W.I.A.

Surely there must be chaps who are willing to spare one evening to impart a little knowledge to our members, for after all, there are only twelve meetings in a year.

S.W.I.s. join the W.I.A. with the thought in mind that some form of teaching is to be had only to find themselves dependent on other S.W.I.s. The foundation is there, so with co-operation, members willing to give a little of their time, the effort in assisting associate members would be more appreciated.

—Chas. Abernathy, WIA-12211.

CALL BOOK MAGAZINE

The Federal Treasurer, W.I.A., has for sale at £1 post paid, some 2000 copies of numbers of this great directory of Amateurs. There are two editions: United States and "Foreign." Write the world except U.S.A. Apply Bob Boase, VK2NI, 50 Cardigan St., Carlton, Victoria.

YOUTH RADIO CLUBS

We have now crossed the Tasman Seal in May, Rex Black answered a query from New Zealand and sent full details of the Youth Radio Scheme. Following is part of a reply received recently: "In reply to your letter of 18th May, we wish to advise that the matters laid out in this letter were discussed fully at our Annual Conference in June of this year. It was decided by the Conference to set up a committee to look into fully the possibilities of setting up a similar Youth Radio Scheme throughout this country, under the supervision of New Zealand Association of Radio Transmitters. At this time, take some time, we are therefore quite happy to allow Mr. John Gilbert of Auckland to enrol his Radio Club as a member in your Scheme." Hearty congratulations to the wise men of ZL.

Ken Matchett's fine VK3 Newsletter No. 5 arrived here with good news of progress there. Val Barnes, equipment officer, has supplies of germanium diodes and some radio equipment, as well as a supply of "A.R." "R.T.V.H." and other publications. These are available on "permanent loan." Since the Amateur is friendly, the donated equipment should continue to arrive—provided there are constant reinforcements. Other items in the Newsletter tell of doings in the clubs. Wonthaggi Tech. School Radio Club has a roll-call of 12 at the last meeting. V.H.f. demonstration was arranged at Christian Brothers College, Bundano, by Dave SZMX, Bert SZFC and Ray SZOE. Twelve members of the School Club operated with Ray (mobile) and Allan SZNG.

I was surprised to find the readiness with which a few Amateurs pounced on any small lapses by our two new call signs—George 1GB and Roger 1RD. Our thanks, however, to the great majority who helped them with tests or merely answered their CQ with a friendly comment. Club leaders should be very firm on the subject of safety as a top requirement. Impatience to get on the air could produce a lowering of safety standards—the young operator should be carefully protected from this. Next in importance is the quality of signal, which should be very good, preferably tested by you before it carries the new call sign. Finally, operating procedure should be well drilled beforehand and tactfully monitored afterwards for a short time. T3, Ken 1KM.

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FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

NEW SOUTH WALES

HUNTER BRANCH

The November meeting was held at the Technical College, the lecture being Amateur Television, by 2Z2DN, N.S.W. 2ZCU and Rodney 2CN who gave a most comprehensive three part lecture on history, theory and practice of tv transmission. Neil described the method of using the local tv. signal to scan a slide, with the programme off, of course. Des displayed various units concerned with generation of 432 Mc. signals and displayed a closed circuit set-up with flying spot scanner and 14 inch tv. rx. Rodney described and displayed some very expensive camera tubes. Des hopes to be able to take pictures mobile with a transistorised camera unit—only 27 transistors.

Forty-one members and visitors were there to listen and watch. At the last examination four local chaps sat for the big quiz, three for the full ticket and one for the limited. Bruce collected another big batch of QSLs for Jim 2AHT at the meeting; Jim must have a mighty score by now. It was a delight to see a visitor to our last meeting, the form of Bill 2ZL. Tony 2ZL has been a very proud father the last couple of weeks. During the short time he was able to get away without asking permission, Tony built a new turnstile for the car to give omnidirectional signals on 2. As well he reckons a few more pieces added to make a play pen for the idea is not unanimously agreed upon at home.

Les 2FJ also has a reason now for not being on the air as much as he'd like since he's been given some extra chores to do following the death of the infant. During November there is to be a hobbies exhibition at Scene and the branch has clubbed together to display some Amateur gear at this function. It is hoped that this may fire up some enthusiasm in the top of the valley and introduce the Amateur to the public as is our aim.

Key 2ZKW, Vic 2AKP, Des 2ZDN and Frank 2APO did a good job during the Scout Jamboree-on-the-Air to further enhance the name of the Radio Amateur and our congratulations go to them and any others who may have been missed for a job well done. By the time you read this, Lionel 2CS will be back in his favourite country and don't forget that he will be the lecturer at our December meeting, to show slides and talk about the trip. Try to make it if you can. The usual place, room 15, classroom block, at the Tech. College is the venue and the date is Friday 6th Dec. As Bill 2ZL will be supplying the supper, I'm sure you'll want to come. Hope we'll see you as there is this meeting until February. Seasons Greetings & 73, 2AKX.

— . . . —

VICTORIA

MIDLAND ZONE

The month of October showed an increase in activity in the Midland Zone, particularly on the 80 mX band, despite the varying conditions and static level. The Monday night hook-ups on this band have improved, both in numbers and in general activity. 2Z members, together with a few more zone members coming in to keep the ball rolling. Stations active are 2Z2D, 3F0, 3F2, 3BD, 3AK, 3AQL, 3MD, with 3ZIK still active on 2 and 1 mX with other members of the zone active on this band. I was on the air for the Scout Jamboree and had a Castlemaine Troop here on the Sunday morning at which time several good contacts were made. Morris 3KO also was very active on the Jamboree and the result is now a regular attendee on the hook-ups on Monday nights.

SILENT KEY

It is with deep regret that we record the passing of:—

VK2FJ—Jack Ferguson.
Ex-XCP—Malcolm Perry.

As we have difficulty in getting sufficient members to attend zone meetings, it has been decided to conduct as much of our zone business on the air each Monday evening on 80 metres, so all members please note. We usually get under way about 8.30 p.m.

20 mX activity is spasmodic and although I have had some good DX contacts on this band, the interesting feature is the re-appearance of short skip which allows International contacts quite frequently. The increase in s.s.b. activity is also very noticeable. 73, 3ND.

WESTERN ZONE

Guess we all enjoyed the Convention held last month in Ararat. Have some very keen members travelling almost 200 miles each way. Next year Convention will be held early in October, near the border so as these chaps will have an easier day.

Was pleased to see George 3GN, who has not been active for a while. Alan 3HL was unable to come to the Convention because of a wog, but is fit again now, working s.s.b. and a.m. mostly on the DX bands. Your scribe for this month will have S.E.C. power before these notes go to print. 73, 3AKW.

SOUTH WESTERN ZONE

There has been more activity in the past few weeks with 3AGD and 3AKR attending the Thursday night hook-ups. We are hopeful of hearing more of the zone members on especially the Ballarat and Hamilton boys. 3WK is a regular along with 3XE, 3AKI and self. 3ARJ seems to like soup and cold soups. 5CJ was in Warrnambool recently, but did not drop in to say hello, you will be in trouble if you do that again Col. With re-

ference to the Jamboree-on-the-Air, John 3AGD is to be commended on his job of organising in this zone. Harry 3AKI and Bill Wines operated portable with the Second Warrnambool Scouts at their camp in the Brunckell bush, but were very shielded. Had contact with Allan 3AYD at Mooroompa but a strong signal washed us out, however Jack 3JA turned his home tx on and we took the boys to his QTH and made some good contacts. Doc Gardner and Bill Wines have now started the Y.M.C.A. Radio Club with 20 students, the official club call sign should be 3AAW. We will meet each Wednesday night at 7.30 p.m. and will be on hook-ups each Thursday night and Sunday morning W.I.A. call-back, 73, Bill Wines.

— . . . —

QUEENSLAND

TOWNSVILLE AND DISTRICT

We all were expecting to have a wonderful time on the Scout Jamboree week-end, but the noise set in and it was frustrating to have so many Scouts and Cubs in attendance when so little was heard and worked. My score was 16 QSOs for 20 hours at the rig. To all those who participated we offer our thanks.

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R." in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.

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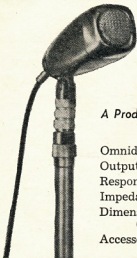
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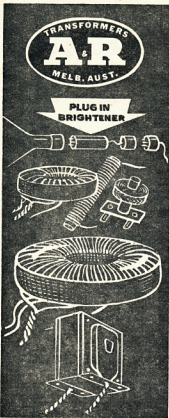
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The weather has now altered since and the Europeans can be heard weekly around 8.30 p.m. E.A.S.T. Bert patiently waits the arrival of George 8NE from the north west. Charlie 4BQ, Ted 4BJ and John 4DJ are seldom heard on the band. I wish each and every one the Seasonal Greetings, also in the New Year may your signals never fade. 73, 4RW.

WIDE BAY AND BURNETT BRANCH

Those who tune in to the Kookaburra session on 80 mx at 0700 must be well informed on what is pertaining to radio in the Wide Bay and Burnett Branch. The group of Scouts who has been enjoying a few months holiday at home in Maryborough, is returning to New Guinea. Bert ex-GWDX, Maryborough, has his VK call which is 4WK, and 160 mx is his stamping ground. Gordon 4GH at Maryborough did his bit by setting up a rig at the Scouts hut and made 11 contacts of about half an hour each, so that would give the Scouts a fair insight into Amateur Radio. Harry 4ZHG Harry 4ZHG has a group of Scouts who are at their places. They contacted among others Jim KH6ELQ at Pearl Harbour, Hawaii. Jim was called at Harry's to 'Australian' accent. Harry, by the way, came from a land not many years ago. Eric also came in on this QSO and when they signed off there was a small 4ZLX group of Scouts who were in the country to have a QSO with him. Another contact was DU1BS/P in the Philippines, whose XYL was tickled at Harry's 'Australian' accent. Another contact was 4ZLX, who had been operating for 48 hours continuously with relieving operators. They were just acknowledging the call and giving the report as there were so many lined up waiting their turn for a contact. So all things considered, the Jamboree appears to have been a success. 73, Fred Cox.

WESTERN AUSTRALIA

I hear our fame is spreading and we have some very interested bodies on Christmas Is. (Indian Ocean side). A recent successful candidate for the Ham exam was Allan Morgan, WA2D. We send especial congrats to Allan and all the other candidates. The Ham exam is a move aloft in the formation of the local Christmas Island Radio Club. Interest is running high and the club has many members who have donated books, etc., to help them along. The recent 40 mx scramble in Sept. brought me 6800 on top in winning the 'President's Trophy', with 63KN taking many more Members' Trophy.

A host of reports about the Jamboree-on-the-Air during October and Nov. Scouts and AYA were hosts to the 1st Tuat Hill Pro. 6P6H had 30 Scouts at various times over the period from Kenwick, Wattle Grove, and Riverton. However, the winning ticket must go to Jim 6RU who not only had Scouts and Commissioners present, but Girl Guides as well, and Jim says he is looking forward to the time when they have a Girl Guide Jamboree on the Air! This is closely followed by Tuat Hill 6RM and 6XZ. Scouts are camping on his property at Waroona for the weekend.

Pat 6PH is going to shift to Narraginn. Does anyone listen to Slow Morse? We don't know, neither does Alec 6AS, who has been patiently sending Morse for 12 months now. No anybody is listening, send in a report, please.

In about six months time we hope some good news that the Scouts will be coming to aid of their Division. Vacancies will exist on Council for various offices. Start thinking about it now, adjust your programme for 1994 to include a year's service for this Division.

On behalf of all Council members and this Division may I wish you and yours all the best for Christmas and the New Year. Merry Christmas in the year of 1994. 73, 6LS.

TASMANIA

On 8/12/93 the ZLs are holding a mammoth field day on 50 and 144 Mc. Stations from all over both islands will be taking part. The

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VKT V.H.F. Group is organising a station to operate from Mt. Wellington on 144.1. The call used for the occasion will be VK7WI and operations will commence about 1200 hours our time.

The Scout Jamboree-on-the-Air was by far the most successful held to date. The main reason for this was that the Scouts were better prepared, more sensible questions being asked, and more indicative answers given. Stations known to have been participating in the south were 7RX, 7ZZ, 7CT/P at Hounville, 7JB who operated with 7BS, the 13th Hobart Scout Station, portable at Orleton Park, 7EB, 7MF, 7SJ and 7ET portable at Sorell.

We were recently visited by 5CT and 2ZTM. By the time this goes to print, TCT will be equipped for reception on 80 Mc., so that the can re-broadcast the v.h.f. notes on the 7WI broadcast. 73, 7ZAV.

NORTH-WEST ZONE

The festive season is almost upon us once more, and no doubt will bring a lot of mobile and portable operation on the bands. In fact Max 7MX has been the guest star in some where down South on holiday, complete with mobile and fishing rod. Hamfest for '93 is now over. The general opinion is that it was not up to the high standards of last year's function, due mainly to the lack of organised activities, especially those for h.f. operators. Quite a number of North-West Scouts attended. Rather sad to relate that George 7XL lost his mobile whip antenna on the way down to the function, but out for the day. Merry Xmas to all, 73, 7ZBH.

HAMADS

Minimum 5/-, for thirty words.
Extra words, 2d. each.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. Copy must be received by 24th Dec. Box 38, East Melbourne, C't. Vic., by 5th of the month, and remittance should accompany the advertisement. Call signs are now permitted in Hamads. Donated advertisements not accepted in this column.

FOR SALE: Collins Equipment of the late VK3JK, 32S-1 Transmitter, £370; 75S-1 Receiver, £370 or offer; Astatic S.s.b. Dynamic Microphone, Model 10-D; Dow Key Relay, DKG0-G2C, 6 volt a.c., s.p.d.t. r.f. switch with d.p.d.t. auxiliary contacts and special isolation connector in de-energised position. All offers in writing to W. L. Jackson, VK3XKM, 23 Malane St., Ormond, S.E. Vic.

FOR SALE: Drake 2B Communication Receiver. New and unused. Apply VK2WS.

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b.c./s.w., 5-18 Mc. approx., miniature tubes, £5. C.r.o. Tube, 5FP7, new, £1/10/0. Miniature Wire Recorder, plays 2 hours, complete, miniature battery charger and twin microphones, etc. mint condition, cash £135, sell £35. Palec Mod. Osc. 150 Kc. to 30 Mc. £15. Philips Oscilloscope, as new, £17/10/0. S.w.r. Meter, twin 0-1 mA. meters, £2/10/0. Tx, small and compact, 1.6-7 Mc., transistorised power supply and mod., £15. Miniature transistorised Rx and B.Z. for Transmitter Hunts, £3. VK3NZ, 17 College Grove, Black Rock, Vic. Phone 99-4363.

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SELL: Heath DX40-Geloso, all bands, both units power supplies enclosed. A.m./c.w., conversion data for s.s.b. available. Very good condition, £70. VK4CK, 72 Canning St., Warwick, Qld.

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SALE: Panda Explorer Transmitter, all bands, crystal mike, 150 watts. Write VK6WS.

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